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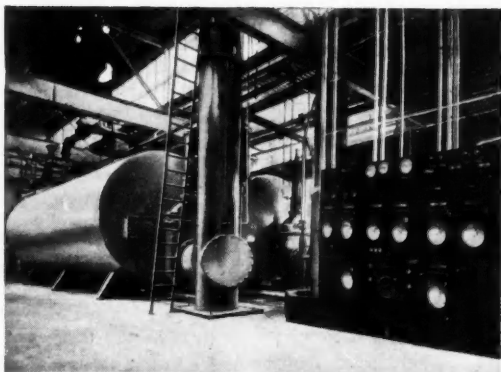
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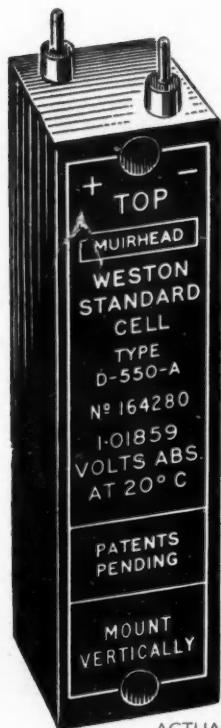
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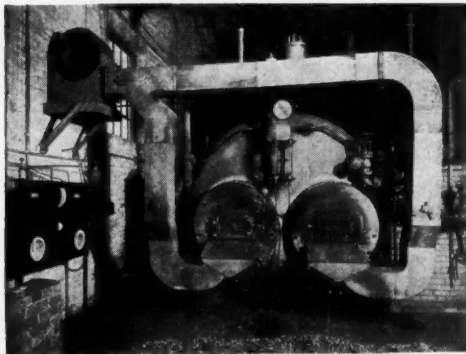
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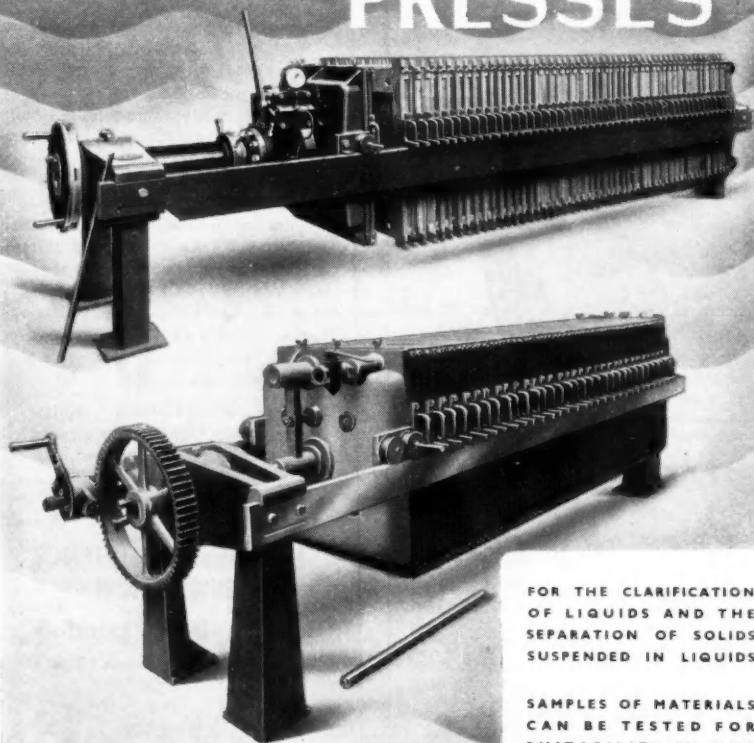
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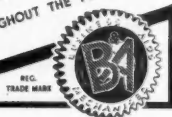
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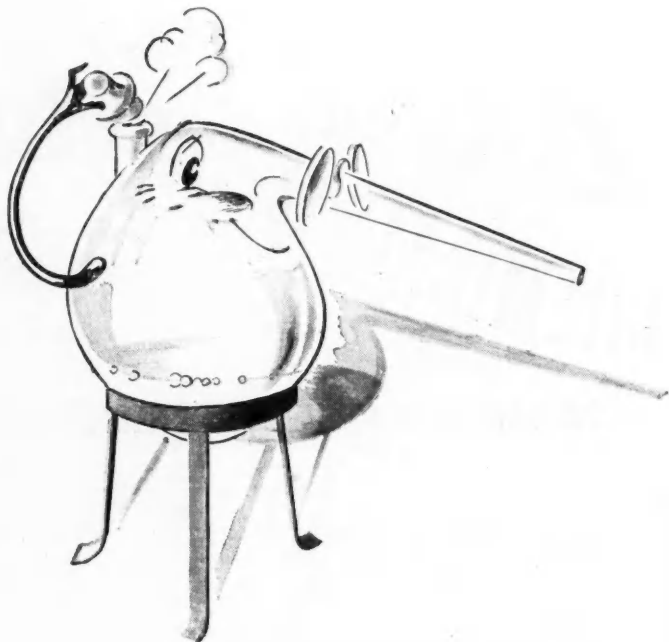
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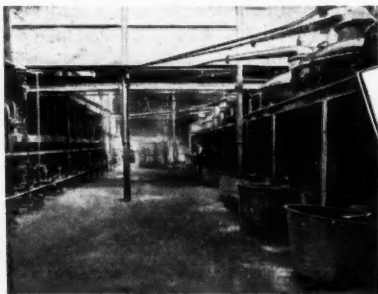


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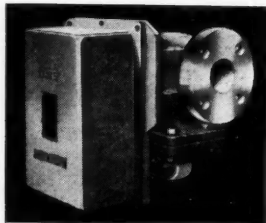


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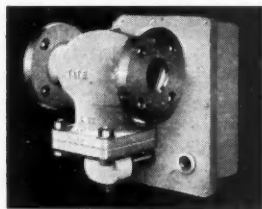
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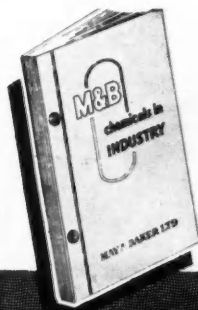
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Volume LXI

12 November 1949

Number 1583

The Scope for Simplification

AS manufacturers and especially as consumers, the chemical industries are directly interested in the potential advantages of further simplification in industry. The qualifying adjective is used advisedly, because simplification is far from being a revolutionary development for British industry. Motor car manufacturers, for example, have already achieved a degree of simplification which would have seemed almost fantastic in the days when the different models available were almost as numerous as the cars on the road. The fact that British standard specifications are used throughout the Commonwealth and elsewhere is in itself a monument to simplification; for standards, standardisation, simplification and specialisation are all very closely linked. British industry is not, therefore, being invited, in the Lemon Report,* to throw over traditional policy for a new system conflicting with the national outlook and industrial principles, but simply to consider the advantages to be gained by the more intensive application of the basic principles governing the development of all large modern industries. Economic

circumstances are producing a growing tendency towards specialisation; the issue now is to decide to what extent this tendency might advantageously be stimulated.

The case for simplification has been ably presented by the almost simultaneous publication of the Anglo-American Council's report, "Simplification in Industry," and the report of the Lemon Committee on the standardisation of engineering products. As large buyers of engineering equipment and stores, the chemical industries could derive considerable benefits from some of the economies which might be effected by eliminating needless variety and simplifying products and materials. A valid example given by the Lemon Committee cites the metal box or can industry, in which considerable progress in standardisation has already been achieved. The committee was advised that the standardisation of paint tins, which the industry carried out in close collaboration with the paint trade, reduced an inordinate number of containers to five significant sizes based on the most economical use of tinplate. This involved a decision to pack paint by volume rather than by weight. The most significant result of these innovations was a saving estimated at

* Report of the Committee for Standardisation of Engineering Products" (chairman Sir Ernest Lemon); H.M.S.O., post paid 10d.

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£100,000 passed on to the paint trade by two factories of one metal box manufacturer alone. That cut in costs is, of course, the crux of the matter in both these recent reports in support of a principle which at any other time might have been condemned as a short cut to stultification of initiative. Some such case can be argued with some force now. The answer is likely to be that extreme circumstances sanction extreme measures. Whatever fruits of innovation and experiment temporarily are lost must be reckoned as a fair price to pay for a policy which can help so substantially the campaign to render United Kingdom goods truly competitive wherever labour and market conditions permit.

Existing prejudice against simplification derives largely from the fear of losing customers through inability to supply a particular size or type required. It is safe to assume that customers, as a whole, are unlikely to nourish lasting grievances or to transfer their business elsewhere, once they discover that purchases of regular products are saving their competitors the large sums that can be pruned in this way. Chemical and petroleum industries have already taken positive steps to stimulate standardisation in relation to

their complex requirements of engineering stores and plant. It is also noteworthy that petroleum equipment manufacturers were among the sections of the engineering industry with which the Lemon Committee held discussions.

Unquestionably the systematic application of simplification and standardisation is capable of bringing about an appreciable reduction in the cost structure of British industry. The effects are cumulative. The chemical industries, for example, can be saved large sums by simplification of the engineering products of which large sections make common use. While a vigorous chemical industry can quite obviously not be confined to certain standardised lines, the good results of prudent specialisation find convincing evidence in the unqualified commercial success of the large chemical groups. Concentration of energy in certain sharply defined directions is common to them all.

Price incentive is, of course, the most powerful inducement which manufacturers can offer for the purchase of lines in regular production. Special designs in the fabricating industries will always be required for particular purposes, but

(continued at foot of page 658)

Notes and Comments

CRL Objectives

THE current report on the work of the Chemical Research Laboratory in 1948 differs from most of its annual predecessors by the indications that it contains that some progress is at last being made towards the achievement for a long cherished ideal. That was the aim, so often deferred, to free this branch of the Department of Scientific and Industrial Research from its rôle of maid-of-all-work to industries at large sufficiently to allow the following up of conspicuous research clues not directly associated with current production requirements. That does not imply that the bulk of the subject matter is not still obviously utilitarian in objectives. The valuable additions to technology now recorded by such sections as the Corrosion of Metals Group, the useful programmes of the new (July, 1948) High Polymers Committee and the Pure Metals Committee are evidence to the contrary. There is, however, now a new note represented by the brief commentary given on innovations in fields such as atomic energy, stable isotopes and some incursions into more fundamental aspects of newer materials, from which the more widely varied developments are likely to stem. The changing outlook of CRL is confirmed by some of the comments in the report of the Chemistry Research Board, over the signature of its chairman, Professor Sir Norman Haworth. That report affirms the intention to study "basic, long-term problems of chemistry and chemical technology of a type which requires the attack of a skilled team over a long period." This introduces another problem, the risk of duplication of the work of universities and some industrial centres. That, observes the board, "may be unavoidable and even desirable." Those who hope to see the present expansion of chemical science and technology continued in the 1950's will applaud the present policy and trust that economic emergency does not deflect the CRL from it.

Changing Patents Procedure

AN agreement in 1948 between France, Belgium, Luxembourg, and Holland to institute an international bureau for determining the originality of patents is now being ratified. It is expected that the bureau will begin work sometime next year. There is much speculation in France as to what will be the repercussions on the patents situation. Will the International Bureau confine itself to announcing priorities or will it pass judgment on the admissibility of specifications? In the latter case, it is being asked to what extent would the bureau's opinion be taken into consideration by French tribunals. The subject, of evident importance to chemical research interests in France and elsewhere, cannot be entirely independent of the project, at present in the provisional stage, for a convention for the creation of a European Patent Office authorised to deliver, after examination of priorities, a European certificate of invention. This was recommended during the 1949 session of the Council of Europe, at Strasbourg. It is thought in France that it would be advisable to continue the examination of this project, the implementation of which is still meeting with numerous practical difficulties, in close co-operation with the bureau recently established at The Hague.

Fertiliser Facts

THE failure of artificial fertilisers to smooth out all the shortages in human nutrition, as some optimistic thinkers in the last century firmly believed they would, is much less the fault of the chemical plant foods themselves than of the relatively meagre use, even now, that is made of them and the frequency with which they are misused. Disregarding the grosser sort of errors in the application of chemical plant food—and they are not uncommon even here—the amount of wastage attributable to lack of

precise knowledge about availability and absorption by plants is almost certainly adding very largely to the amount of good material that is used to no good purpose. That is basically the problem which has evoked some very promising results of research in the U.S.A. America has, of course, no monopoly of work in this field; but, as it publishes significant results with alacrity and is making full use of radioactive materials from the Oak Ridge Laboratory, much of the credit for what is now being done to "tailor" artificial and mineral manures to serve particular needs is being given to the U.S. Department of Agriculture.

Tracer Evidence

ROCK phosphate, irradiated in the Oak Ridge pile, is the source of most of the clues now being documented regarding what happens to certain fertilisers under differing soils and crops. The problem is far from new, but knowledge has hitherto tended to be of the empirical sort. The U.S. workers seem now to have firmly established that the activity of rock phosphate as a source of phosphate is regulated by the pH of the soil, and where this is exceptionally high the take-up of the added phosphorus is almost inhibited. A further phase of the experiments, of which this first "greenhouse" series has recently concluded, yields a further testimonial to superphosphate. Applied in a mildly acid soil (pH 5.8), superphosphate yielded up at least as much phosphorus as did five times as much rock phosphate. These are only isolated examples of the essential data which are being put into the hands of fertiliser and soil chemists and food producers by a logical use of the tracer principle. They represent only a beginning. The neutron irradiated fertilisers contained large proportions of radiocalcium, radiosodium and other radioactive elements. Ultimate conclusions may enforce important changes in chemical fertiliser formulation and uses. They may even bring appreciably nearer the goal, still so far from attainment, of cajoling the soil to yield an

adequate sustenance to all who bring to it industry and a modicum of science.

Facts versus Prejudices

THE mental myopia in one connection of the brilliant Professor J. D. Bernal, which permitted him to tell a Moscow audience last summer that science "in capitalist countries" is directed by those whose only aim is to destroy and torture people for their own profit, has had the virtually unavoidable result. He has been dropped from the council of the British Association, whose devotion to the dispassionate presentation of facts cannot be reconciled with this eccentricity of the Professor of Physics of Birkbeck College. Characteristically, the British Association first invited the professor's own comments on the Moscow Press's version of what he said and took what comfort it could from his admission that scientists here and elsewhere are not, in fact, "haters of peace." That, however, conspicuously failed to substantiate the distorted picture of world science—outside the Soviet Union—which the professor is reported to have presented. He has the problematical advantage of saying the last word on the subject. By declining to re-elect him, states Professor Bernal in a letter to the association this week, "it is lending support . . . to a policy of using a scientific effort, far greater than is made available for improving the conditions of life of the people of this country, to produce new 'scientific' weapons clearly directed against the people of the Soviet Union."

THE SCOPE FOR SIMPLIFICATION

(continued from page 656)

in such cases the customer is usually willing to pay the higher price to cover the additional manufacturing costs.

Simplification, like any other good thing, can be carried to excess. Reduction of needless variety, and, in many instances a higher degree of specialisation, should broadly be feasible, however, without sacrificing individuality in production or unduly restricting the consumer's range of choice.

ATOMIC ENERGY EXHIBITION

Products of Sellafield Factory

"IF we can get an atomic reaction, we can release more than a million times more heat and power from a given quantity of material than is possible by the chemical reaction obtained from coal. It is because of that prospect that we must give very deep consideration to the possibilities of atomic energy," said Mr. C. Hinton, deputy controller of atomic energy production, at the opening, last Saturday, at Whitehaven, of the local atomic energy exhibition. (*THE CHEMICAL AGE*, 61, 622.)

It was realised, he said, that the new factory at Sellafield (Cumberland) would be regarded with a good deal of suspicion. The exhibition was intended to show what lay behind the work that was being done there and to help the public to understand some of the problems involved.

Dealing with the question of personal danger, Mr. Hinton said:—

"It is true that we shall be discharging radioactive effluents and that they are potentially dangerous," but I find it difficult to think of any industry which does not discharge products in its effluents that are potentially dangerous. The reason they do not bother anyone is that these potentially dangerous products are so diluted, either before or after discharge, that they are completely innocuous. The same is true in our case. Radioactivity we discharge will be diluted in such a way that no danger can arise in the district."

Royal Society Honours

H.M. the King has approved the award by the Royal Society of Royal Medals to Sir George Thomson, F.R.S., and Professor R. A. Peters, M.C., F.R.S. These recognise the distinguished work of the former in atomic physics, notably in establishing the wave properties of the electron, and Prof. Peters' distinction in biochemistry, particularly in relation to vitamin B₁₂ and the mechanism of toxic action of Lewisite and arsenical compounds.

Among other honours just awarded by the Royal Society Council are the Copley Medal to Prof. G. C. de Hevesy, for his work on radioactive elements and the biological use of tracer technique, and the Davy Medal to Prof. A. R. Todd, F.R.S., for achievements in organic and biochemistry, especially in relation to vitamins B₁₂ and E.

NUCLEAR PHYSICS

Anticipating Industrial Application

PLANs are being pushed ahead to supply the deficiency of adequate discussion in Scotland of atomic energy. Glasgow, it is hoped, may ultimately become one of the important centres for discussion of atomic and nuclear physics, particularly with relation to their industrial applications. The development of experimental equipment at Glasgow University and the need to relate that research to industrial practice has encouraged the Glasgow branch of the Institute of Physics to launch a series of lectures this season, aimed at extending the distribution of current knowledge among physicists. Prof. Philip I. Dee, of Glasgow University, will launch this series with a lecture on "Waves and Atoms" and he and other speakers will maintain the course until late March 1950, when a survey "Recent Work and Future Prospects" will be made.

The hope is that this programme will awaken a wider interest in the subject and bring technicians in the West of Scotland up-to-date on the progress made in the field and lead finally to industrial benefits. Attendance will be limited to members of the Institute of Physics and their guests.

NOBEL PRIZE AWARDS

PROFESSOR W. F. Giaque, professor of chemistry at the University of California, has been awarded this year's Nobel Prize in chemistry. Aged 54, he has achieved wide distinction by his studies into the behaviour of matter in temperatures approaching absolute zero. In 1929, with another American scientist, he was co-discoverer of the oxygen isotopes.

The 1949 Nobel Prize in physics, worth approximately £11,000, goes for the first time to a Japanese scientist. Dr. Hideki Yukawa, aged 42, has been visiting professor of theoretical physics at Columbia University, New York, since September last, and receives the award for his theoretical research in the field of nuclear energy and fundamental contributions to atomic physics.

In 1935, when he was 28, the doctor announced in Osaka a new theory on subatomic particles, which was later substantiated in the identification of mesons.

The awards will be made at a ceremony in Stockholm on December 10.

Sulphuric Acid Statistics

U.K. Production and Consumption in Third Quarter

THE particulars of production and consumption of sulphuric acid and oleum in the third quarter of this year, issued by the National Sulphuric Acid Association, Ltd. (shown below), refer to the United Kingdom only and do not, as previously, include the quantities for Eire. An accurate comparison with other statistical periods is therefore not possible, although certain of the figures available give indication of an upward trend in use of acid as, even without the inclusion of Eire tonnage, they register an advance on the second quarter of the year. Examples are:—Stock of 100 per cent H_2SO_4 at September 30 (chamber and contact) 67,125 tons, against 62,421 tons (U.K. and Eire) at June 30. Consumption: agricultural purposes 8695 tons of 100 per cent (1736 tons second quarter); clays (Fuller's earth, etc.) 2324 tons (2048 tons); paint and lithopone 28,595 tons (27,406 tons); rayon and transparent paper 46,385 tons (39,401 tons). Comparison of total acid production shows an apparent reduction of 24,303 tons.

CONSUMPTION OF SULPHURIC ACID AND OLEUM United Kingdom

	Tons 100% H_2SO_4
Accumulators	2,287
Agricultural purposes...	8,695
Bichromate and chromic acid	2,790
Borax and boric acid ("unclassified")	
Bromine	3,189
Chlorosulphonic acid ("unclassified")	
Clays (fuller's earth, etc.)	2,324
Copper pickling	551
Dealers	4,308
Drugs and fine chemicals	2,394
Dyestuffs and intermediates	15,738
Explosives	3,007
Export	728
Formic acid ("unclassified")	
Glue, gelatin and size	220
Hydrochloric acid	15,133
Hydrofluoric acid ("unclassified")	
Iron pickling (incl. tin plate)	21,677
Leather	1,547
Metal extraction	532
Oil (mineral) refining	12,754
Oil (vegetable) refining	2,483
Oxalic, tartaric and citric acids ("unclassified")	
Paint and lithopone	28,595
Paper, etc.	974
Phosphates (industrial)	1,439
Plastics, not otherwise classified	3,776
Rare earths ("unclassified")	
Rayon and transparent paper	46,385

Sewage	2,990
Soap and glycerine	2,354
Sugar refining	132
Sulphate of alumina ("unclassified")	
Sulphate of ammonia	59,837
Sulphate of barium	1,144
Sulphate of copper	3,647
Sulphate of magnesium	1,465
Sulphate of zinc	740
Superphosphates	101,929
Tar and benzole	4,155
Textile uses	5,823
Unclassified: Uses known	24,149
Uses unknown	9,939
Total	399,850

PRODUCTION OF SULPHURIC ACID AND OLEUM (Tons of 100% H_2SO_4)

	Chamber only	Contact only	Chamber and Contact
Stock July 1, 1949	31,933	28,835	60,768
Production	165,193	237,733	402,926
Receipts	38,421	14,205	52,626
Oleum Feed		2,936	2,936
Adjustments	-341	-134	-475
Use	91,588	82,044	173,632
Despatches	112,366	165,658	278,024
Stock Sept. 30, 1949	31,252	35,873	67,125

Total capacity represented	199,170	253,370	452,540
Percentage production	82.9%	93.8%	89.0%

RAW MATERIALS Tons

	Pyrites	Spent Oxide	Sulphur- and H_2S	Zinc Concen- trates	Anhy- drite
Stock					
July 1, 1949	64,404	171,648	75,606	11,250	810
Receipts	55,999	52,086	80,553	70,840	43,390
Adjustments	+84	-213	-82	+16	—
Use	49,750	45,735	77,818	36,484	43,480
Despatches	61	3,959	59	—	—
		49†	99†		
Stock					
Sept. 30, 1949	70,676	173,778	78,101	45,622	750

† Used at works for purposes other than sulphuric acid manufacture.

More Sulphuric Acid for Australia

Plans to increase the Australian production of sulphuric acid will result in important extensions to the works of Sulphide Corporation, at Cockle Creek, New South Wales. Two technicians from Great Britain recently visited Australia in relation to the project, Mr. Stanley Robson, director general of research, Imperial Smelting Corporation group and Mr. A. T. Rogers, chemical engineer of the same group.

GERMAN TECHNICAL DATA *Stimulus to U.S. Chemical Industry*

THE full benefit which America may ultimately derive from the body of technical information gained from Germany since the war, is only just beginning to be realised.

More than 100,000 reports on synthetic fuels, jet missiles, chemical warfare agents and many other subjects have been released so far. It will probably take many years to evaluate all the millions of pages of technical material obtained from the Germans. Colonel Kuhn, president of the Armed Forces Chemical Association, told a recent meeting of the American Chemical Society.

The subject file of the Office of Technical Services, which handles the work for the U.S. Government, contains more than 450,000 cards, but the indexing is by no means complete.

One of the most significant developments, so far as the chemical industry as a whole was concerned, said Col. Kuhn, was the Fischer-Tropsch process for production of synthetic oil from coal. The first commercial plant is expected to go into production shortly at Brownville, Texas, where about 150 tons of oxygenated chemicals will be produced daily.

Special Hydrogen Peroxide

Information relating to the manufacture of high concentration of hydrogen peroxide and its safe handling, storing and shipping had stimulated its production by two firms in the U.S.A., the Colonel continued.

Two other German chemicals referred to by Colonel Kuhn, which are now in commercial production in the U.S.A., were the so-called white carbon black and chlorobromomethane. The former, originally developed as a substitute, is a finely-divided silica. The latter, a new fire-fighting fuel, was used by the Germans in fixed fire-extinguishing systems in naval vessels.

In the range of insecticides a number of German developments were being exploited in the U.S.A., including the fluor analogue of DDT which is claimed to be less toxic to warm-blooded animals and fish.

Carbomethyl cellulose, produced in Germany under the trade name Tylose, was stated to have the property of keeping dirt in suspension when used as an ingredient of washing powders.

SUPERPHOSPHATE TALKS *Experts Study Italian Methods*

SOME 100 delegates from no fewer than 17 different countries in Europe, Africa, Asia, and Australia attended a series of technical meetings in Italy of the International Superphosphate Manufacturers' Association held between October 25 and 28.

The meetings were held in Milan and Assisi at the invitation of the Montecatini group, by whom all arrangements were made.

While in Milan, a number of papers under three main headings were presented and discussed. They dealt with sulphuric acid and phosphoric acid fertilisers, triple and ordinary superphosphate.

Delegates visited in Assisi the completely reconstructed superphosphate plant there which employs the Montecatini process for continuous production and, on the way from Milan, a visit was also paid to the sulphuric acid works at Reggio Emilia.

It is planned that the next series of technical meetings of the association shall take place in France in late September or early October 1951, by invitation of the French superphosphate producers.

Two Killed at I.C.I. Works

A FATAL explosion which blew off the top of a big liquid chemical tank occurred at the Lostock works of I.C.I. (Alkali), Ltd., Northwich, on November 1. The victim was Mr. Samuel Wall, aged 54, boiler-maker, of Northwich, who was carrying out repairs to the tank, which holds many thousands of gallons of chemicals, and was standing on the roof when the explosion occurred. He was blown a considerable distance. Two men working near the spot had narrow escapes.

Mr. Norman Evans, a labourer, of Chapel Lane, Moulton, near Northwich, was killed at his work at the Lostock Chemical Plant of I.C.I. (Alkali), Ltd., on November 5 when he was caught in a moving belt. Mr. Evans was 41 and was married.

Fatal Accidents Decline

DEATHS from industrial accidents reported in September were 108, compared with the revised figure of 132 for August 1949, and 129 in September last year. There were only two deaths in the chemicals, oils, soap and allied trades, a drop of seven below the number reported for the previous month.

SCOTTISH ENGINEERING

Future Aid to Chemical Engineers

IN a progress report on the establishment at East Kilbride, Scotland, of the new DSIR mechanical engineering research laboratory, it is stated that much of the work to be undertaken will demand equipment of a type not previously in use. Regarded as a most encouraging feature of the staff situation is the number of university men who have already indicated their interest in employment in this new laboratory. Among them, it is said, are several Scottish graduates who have been doing research work in England at a higher rate of pay than they are being offered at East Kilbride.

While the laboratory is not yet shaped to handle chemical engineering problems as such, it is expected that it will provide a great deal of new data for this type of research, leaving it to commercial undertakings to follow up the chemical aspects. In the general programme are such subjects for research as the flow of materials, heat transfer, and problems of lubrication and corrosion.

The East Kilbride laboratory is expected ultimately to employ some 600 technicians and scientists, and the probable annual expenditure is estimated at £250,000.

Another Steel Record

STEEL production in October attained a new high level, the output of ingots and castings reaching an annual rate of 15,959,000 tons, 53,000 tons more than in the previous month. The former record for October was established last year with a rate of 15,455,000 tons.

Pig iron also showed an increase in output, with a total last month of 9,565,000 tons, as against 9,525,000 tons in October last year.

Total steel production for the first 10 months of this year amounted to 12,814,000 tons, an increase of 561,000 tons, compared with the same period last year.

Comparative figures for October and the first three quarters of the years 1948 and 1949 were:—

STEEL INGOTS AND CASTINGS
(Thousands of tons)

	1949		1948	
	Weekly average	Annual rate	Weekly average	Annual rate
First quarter ...	305	15,850	287	14,933
Second quarter ...	307	15,944	295	15,325
Third quarter ...	280	14,552	269	13,998
October ...	307	15,959	297	15,455
PIG IRON				
First quarter ...	179	9,324	175	9,084
Second quarter ...	184	9,559	182	9,464
Third quarter ...	182	9,448	176	9,143
October ...	184	9,565	183	9,525

PARLIAMENTARY TOPICS

Report on Water Pollution

QUESTIONS regarding the prevention of pollution of Scottish rivers were dealt with by Mr. Arthur Woodburn, Secretary of State for Scotland, who stated that treatment of sewage and effluent was the concern of local authorities, but he would give them all support. Asked if it would not be advisable to create one pollution authority, so that there would be a uniform approach to the problem, Mr. Woodburn replied that recommendations of a practical nature might be expected from the report of a sub-committee of the Water Advisory Committee at present considering the problem of river pollution.

PURCHASES of rubber for stockpiling in the U.S.A. were the subject of a question by Mr. L. D. Gammans to the Chancellor of the Exchequer. In reply, the Economic Secretary to the Treasury (Mr. Douglas Jay) said that the U.S. Government did not publish figures of quantities taken into the stockpile, but total exports from British territories in South East Asia from January 1 to August 31 this year were 164,908. The U.S.A. had recently announced that purchases were to be resumed.

ADMINISTRATIVE and technical posts vacant in the Colonial Service were shown by the Secretary of State for the Colonies (Mr. Creech Jones) to have been 1198 on September 30, compared with 1395 at the end of June. He said that a system of central pools of specialist officers, which could be drawn on by Colonial Governments to carry out particular undertakings, had already been adopted in various fields of research, notably medicine and agriculture, and might well be extended to other specialised services.

Castor and Rape Oils

THE Ministry of Food announces changes being made in the arrangements for the supply of crude and processed castor and rape oils. (1) For supplies (as from November 5) buyers of crude castor oil and rape oils should apply direct to the Hull or London branches of the National Association of United Kingdom Oil and Oilseeds Brokers, Ltd., which will issue contracts on behalf of the Ministry at the official prices ruling at the time.

(2) The Ministry will discontinue the issue of supply orders for processed castor and rape oils for delivery after November 5, and buyers should thereafter apply direct to processors for supplies.

WATER POLLUTION

DSIR Work on Trade Effluents

INVESTIGATIONS of waste waters from the washing of wheat and the steeping of barley, and of the treatment of effluents from the manufacture of cider and the pickling of steel, are among the work of the Water Pollution Research Laboratory, described in "Water Pollution Research, 1948," published for the DSIR by HMSO (1s. 3d., by post 1s. 5d.).

The most detailed work appears to have been on the treatment of waste waters from electro-plating and particularly of those containing cyanides. A procedure is described by which cyanide can be removed by treatment of the liquids with bleaching powder or sodium hypochlorite in alkaline solution under controlled conditions.

At the request of the Mersey Docks and Harbour Board an attempt was made to determine what would be the effect of discharging into the Mersey Estuary an alkaline sludge produced in the manufacture of sodium carbonate by the Solvay ammonia process. Untreated sludge had a specific accelerating effect on the rate of deposition of mud from the estuary water, but this effect could be removed by carbonation of the sludge.

Sludge and Waste Liquors

Although suggestions were made which would mitigate the effects of the discharge of sludge, it was impossible to forecast the ultimate effect of the material on the growth and consolidation of banks in an estuary, and the investigation has emphasised the urgent need for basic research into the factors affecting deposition and erosion in estuaries.

Some of the investigations which have been undertaken on purification and disposal of waste liquors are reported to have been of direct profit to industry in suggesting improvements in manufacturing processes or methods of reducing losses of valuable materials.

Of the new investigations referred to, one of the most interesting is that to be undertaken for the Port of London Authority, to examine the causes of silting in the Thames Estuary. The survey will include investigation of the degree of pollution of the estuary water, the character of the bottom deposits, the quantity, nature and origin of the material carried in suspension and the physical and chemical effects of polluting substances.

NEW FREEZING PROCESS

Industrial Ice Blocks in Two Hours

A NEW technique in ice manufacture that shortens the freezing process from about 20 to two hours, with a substantial saving in investment and production costs, is reported in Haifa (Israel), developed by a local engineer and industrialist, Mr. Eugen Wilbushewich.

The new technique departs from the customary method by dispensing with the medium of brine, and the evaporating of ammonia abstracts the heat directly from the fresh water moulds. In the experimental plant, the square mould is placed inside a container in which ammonia is gasified. As the ammonia evaporates, it absorbs the heat of the fresh water through the walls of the galvanised steel mould and freezes it into a square 25-kilo block of ice of the exceptionally low temperature of -15°C .

An ice block of anything less than -4°C ., by the old method, is prone to crack on contact with the warm water with which it has to be loosened from the mould. The new technique uses warm gas for defrosting, and the conic blocks slip out with a shrinkage of only 2 per cent.

The new way of manufacturing ice requires very much less than the electric power now consumed by ice factories. Costs of maintaining compressors and other machinery may be reduced and only one-sixth of the normal factory space will be needed.

Supersonic Factor in Electrolysis

DR. F. A. LEVI, of the University of Perugia, reports in *Ricerca Scientifica* some interesting experiments he has carried out with supersonic waves.

Concerning the formation of metal crystals in electrolysis Dr. Levi has studied especially the influence of supersonic acoustic waves. He constructed a special apparatus for his experiments, in which these waves were generated in water by piezoelectric quartz and introduced into the cell through a thin metal strip, the inner surface of which acted as a cathode. Thus the effect of supersonic waves operated during the formation of the crystals. The electrolyte used was nitrate of silver and the best results were achieved with the most concentrated solutions.

The experiments showed that with supersonic waves a much finer crystal structure is obtained.

ESTIMATION OF WATER IMPURITY

Recent Analytical Technique Discussed

THE various established methods of water examination and some recent improvements in analytical techniques were discussed at a recent meeting in London of the Society of Public Analysts and Other Analytical Chemists.

Dr. J. H. Hamence described the work of a joint committee representing the SPA, the Institution of Water Engineers, and the Royal Institute of Chemistry, which had been set up to formulate standard methods for the physical and chemical examination of water. Its report, just issued, also recommended the publication of the results of analysis, and expressed the hope that the suggested standard methods would form the basis of English official procedure. The work of the committee, he said, had demonstrated that considerable interest was being taken in the chemical examination of water, but that many related problems still remained to be solved.

Turbidity

In a paper on "The Determination of Turbidity," Dr. Roy C. Hoather reviewed the methods at present in use, the results of which, he said, were expressed in parts per million on the fuller's earth or silica scale, and the instruments used had to be calibrated accordingly. With a specified definition of the fineness of the suspension, the weight of fuller's earth afforded a fairly satisfactory means of standardisation.

To avoid slight variations and discrepancies as compared with the results given by the APIA instrument, it was suggested that, for the accurate preparation of the fuller's earth standard, the Jackson candle turbidimeter should be used in this country. This instrument—which was shown at the meeting—could also be used for directly determining turbidities greater than 25 parts per million. Its readings were almost independent of any colour in the water. Precise measurements could also be made with photoelectric instruments, but with these colour introduced a complication.

Dealing with residual chlorine determination, Mr. G. U. Houghton said a satisfactory method must be one of high sensitivity, tolerably free from interference by traces of other oxidants, and able to give sharp differentiation between free chlorine and chloramines. The

original acid toluidine method of Ellms and Hauser was still in use but was not entirely satisfactory, and an improved *o*-toluidine had been prescribed officially in the U.S.A.

Useful modifications of the *o*-toluidine method were the so-called "flash" test and the toluidine-arsenite method. *p*-amino-dimethyl-aniline had been used with success for colorimetric determination and very promising results were being obtained by amperometric methods.

The methyl orange method, suggested Mr. Houghton, was worthy of further study. The Palin neutral-toluidine method made possible the separate determination of free chlorine, and mono-di- and tri-chloramines in a mixture. Iodimetric titration was valuable for higher chlorine contents.

A joint British committee had recently recommended that the Ellms and Hauser method be approved for use in this country for the time being and that the newer methods should be examined with a view to their future adoption as standard.

An improved method for the direct Nesslerisation of water samples was described by Mr. J. E. Houlihan. In this sodium hydroxide was replaced by sodium hexametaphosphate. Sodium hydroxide used in the preparation of samples could give rise to serious errors, as the Nessler colour deepened progressively with increasing concentration of alkali in the matching solution. Its use might be avoided by the addition of a small quantity of sodium hexametaphosphate (calgon), and filtration became unnecessary.

Value of Calgon

Calgon did not wholly remove the precipitate due to certain soluble salts present in some tidal river waters, but it could be used to reduce substantially the amount of sodium hydroxide that was necessary. The method had given results for sewages and effluents that compared favourably with those obtained by controlled distillation. It was simple and economical of time, bench space and apparatus. It should be applicable to a wide range of water samples.

New German Chemical Works

A superphosphate and sulphuric acid factory has recently started operations at Salzwedel.

CROTONIC ACID

Versatile Character of New Paint Material

CROTONIC acid is being produced in commercial quantities for use in the production of new protective films, moulding compositions, plasticisers, solvents, insecticides, vitamins and a wide range of organic compounds.

This unsaturated acid— $\text{CH}_3\text{CH}=\text{CHCOOH}$ —is a white crystalline substance with a melting point of $70-72^\circ\text{C}$. ($158-162^\circ\text{F}$.) and a boiling point of $182-185^\circ\text{C}$. ($360-365^\circ\text{F}$.). Crotonic acid exists in two geometric forms, of which the trans-, melting at 72°C ., is the more stable. Producers therefore attempt to manufacture the acid as the stable trans isomer, with only enough of the cis-form to give a slight depression of the melting point.

The pH of a saturated aqueous solution at 25°C . (8.5 gm. per 100 gm. water) is 2.5 and the ionisation constant $K=1.97 \times 10^{-3}$.

Crotonic acid is freely soluble in ethyl alcohol, iso-butyl alcohol and n-butyl alcohol, also acetate, iso-butyl acetate, n-butyl acetate and ethyl acetate. It is somewhat less soluble in toluene (37 gm. per 100 gm. solvent) and rather more so in styrene (42 gm. per 100). In vegetable oils, such as linseed, soya, castor and chinawood, crotonic acid is only slightly soluble.

Paint Uses

Crotonic acid is of interest to paint manufacturers for the following purposes:

1. As an ingredient of oil paints to improve gloss and increase covering power. This is described in U.S. patent: 833,274, November 24.

2. To form lacquer resins by condensation of the acid with linseed oil under the influence of heat and pressure. It is claimed in U.S. patent 2,188,882 that such resins exhibit fast drying action, good dispersion properties and excellent adhesion to metals.

3. To produce compounds suitable as protective coatings, e.g., copolymers of crotonic acid and derivatives with vinyl esters. According to the French patent 837,360, taken out by I. G. Farbenindustrie A.G., and American patent 2,263,598, these copolymer films are characterised by their low water transmission factor, excellent ageing properties, high melting point, high gloss and excellent adhesion. American patent 2,346,858 describes a method of

carrying out the copolymerisation in the presence of a drying oil.

4. To make varnish resins by polymerising a mixture of pentaerythritol, rosin acid and crotonic acid. This is covered by U.S. patent 2,383,624.

5. For making protective coatings from copolymers formed from crotonic acid and styrene or its analogues. These are described in British Patent 547,328; U.S. Patent 2,321,896; U.S. Patent 2,290,164, and U.S. Patent 2,260,005.

6. For producing film forming compounds by heating and blowing the crotonic esters of polyhydric alcohols to give resinous bodies. Three American patents mention these resins: 2,117,293; 2,156,144 and 2,198,373.

7. As plasticisers for cellulose lacquers the copolymers of crotonic acid and styrene are of practical interest. Glyceryl tricrotonate has been patented (French patent 766,698) as a plasticising compound for cellulose esters, particularly cellulose acetate, where films are required to possess great strength and flexibility at low temperatures. The ester of β -(2-methoxyphenoxy) ethanol and its homologues is claimed by U.S. patent 2,350,325 to possess excellent plasticising characteristics. The liquid is clear, colourless and non-volatile.

8. For wood sealing, the condensation product formed by fusing crotonic acid with isobutylamine is claimed to be very efficient (U.S. patent 2,233,531).

9. As chemical and solvent resistant coatings for chemical plant. These coating resins are made by copolymerising vinylidene chloride with a crotonate, such as allyl or chlorallyl crotonate.

Owing to the highly reactive nature of crotonic acid (due to the presence of the activated double bond) a very large number of resinous compounds can be formed. Many of these have already been studied by Tennessee Eastman Corporation and other chemical companies interested in developing crotonic acid.

X-ray Generator for Hospital

The U.S. Atomic Energy Commission has approved the export of a 2-million volt electrostatic X-ray generator for use by the Westminster Hospital, London, in the treatment of cancer.

DUTCH INDUSTRIAL TECHNOLOGY

Important Contributions by Chemists at Eindhoven

by J. GREENROYD

THE essential nature of the rôle played by the chemist in continually widening fields of industrial research is no longer open to doubt. To-day, in addition to his familiar function associated with the testing of materials, the chemist, and especially the physical chemist, is finding increasingly rewarding employment in the provision of new ones and, in doing so, occasionally lays the foundations of entirely new industrial activities.

Typical of the greater use of chemical methods is the research carried on at the Philips' Laboratory of Scientific Research, at Eindhoven, Holland. This centre, owned by N.V. Philips' Gloeilampen-fabrieken, clearly evidences the changes that have taken place in the last ten years or so, an indication of which is the fact that this was previously styled Philips' Physical Laboratory.

Electro-Technical Problems

Although the laboratory had originally been set up for physical research, engineers were soon needed to cope with the development of radio sets, X-ray units, etc., which involved electro-technical and constructional problems. Chemists were then in a minority, but a change was necessitated to keep astride of manufacturing progress and there are at present about equal numbers of physicists, chemists and engineers.

At the central laboratory there are now about 750 employees—graduates, assistants, instrument-makers and other technicians, draughtsmen, administrative personnel, etc. The number of university science graduates there is about 150. The various manufacturing departments at Eindhoven and elsewhere have, in addition, their own development laboratories, employing some 2000 people, of whom about 150 are either university graduates or qualified engineers.

The increase in the number of chemists in the last few years is related principally to the programme for improving the quality of the articles manufactured, and the consequent search for other and better materials. Thus, new fluorescent substances and magnetic materials have been found which have contributed largely to the further development of tubular-fluor-



Injecting fluorescent powder into tubular electric lamps

escent lamps, radio circuits, telephone parts, etc.

In the manufacture of gas discharge lamps, first the sodium lamp, then the mercury vapour lamp, especially the super high-pressure mercury lamp, superseded in many fields the "tungsten" filament. Then, in the tubular-fluorescent lamps, it was the job of the chemists to find the special composition required for the white fluorescent powder which coats the inside of the tube.

The development of small radio valves and electronic tubes has led to the production of new apparatus and parts, particularly in the field of magnetic ceramics for filter coils. It has been very difficult to obtain for high frequency currents a coil of high quality and low losses, especially in small sizes. This has been countered by the use of cores made of iron powder, ferro-magnetic oxides, etc. These are virtually insulators and do not support eddy currents. By making various compounds, it has also been possible to reduce

the rather high hysteresis losses which at first occurred.

Such has been the development of production of new ceramic materials for electro-technical purposes, to allow for simpler and better construction of parts, including condensers and resistances, that an entirely new building is being erected for their manufacture.

For long industrialists were faced with an apparently insoluble problem in relation to magnets. To achieve a sufficiently high ratio of magnetic attraction, so large a proportion of metal had to be used that the principle was often impracticable. One of the solutions to this came in Ticonal, a magnetised alloy developed by Philips. The Ticonal magnet can lift 3500 times its own weight, and two small magnets weighing only two pounds when placed together could not be dragged apart by two horses pulling in opposite directions.

As in other laboratories, the research work done in Philips' research establishment often produces results in a field entirely different from that intended. For example, an investigation that was begun to determine the efficiency of ultra-violet lamps for combating rickets (rickets) led to a new method of producing vitamin D₂.

Synthetic Vitamins

The significance of this synthetic production of vitamin D₂, discovered by Dr. J. van de Viet and Dr. W. Stevens, both working for the chemical laboratory of the affiliated company of Philips-Van Houten, at Weesp, North Holland, lies in the prevention of bone weakness in chickens. Up to that time vitamin D₂ had been imported in the form of cod liver oil or prepared from Zeeland mussels, and was very much more expensive than the new synthetic material.

Incidentally, a merger has recently been reported between Philips-Van Houten, Roxane and Physica, the new company to be known as N.V. Philips-Roxane Pharmaceutical Chemical Industry "Duphar." The new organisation will concentrate on the research work, manufacture and marketing of its own products.

In quite a different field, investigations have been made by the Philips' Research Laboratories on behalf of a famous Dutch bulb-growing firm. In these experiments X-rays have penetrated the cells which form the bulb, regrouping the chromosomes. Actual changes have been made in the shape, colour and size of tulip bulbs and new and improved blooms have often resulted.

Micro-photography has recently been employed by Philips' chemists in developing and perfecting a grainless sensitive layer which enables extremely small reproductions to be made. Thus a single page of, say, the *Encyclopædia Britannica* can be reproduced in an area of one sq. millimetre.

High Frequency Currents

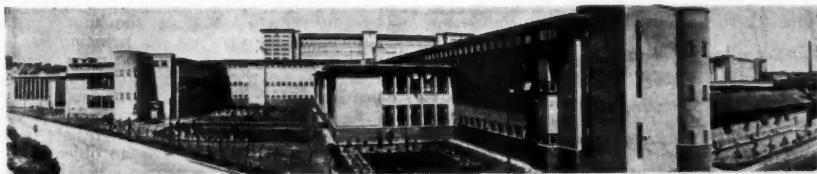
Since the end of the war, the Philips organisation has been working intensively on new applications of high frequency currents and inductive and dielectrical heating. This has opened up very wide possibilities for the application of local heat in industry for the melting, hardening and soldering of metals, for the bending and glueing of wood, the dehydration of pharmaceutical products, and the pre-heating of material used in the moulding of plastics.

The possibilities of plastic materials for use in Philips' workshops are continually being examined, and several of these have already been made synthetically. Special attention has also been given to researches in the field of solids and semi-solids.

Dr. E. J. W. Verwey, director of chemical research at Philips, and Prof. J. T. G. Oberbeek, of Utrecht, have concentrated much research into the mechanism of colloids, the stability of colloid solutions and the interaction of neutral colloidal particles, and Prof. H. B. G. Casimir, director of the Philips' laboratory, and his assistants have worked out their theories in detail.

One of the outstanding examples of the combination of physical and chemical research in the Philips' laboratory has been

(continued at foot of next page)



Philips' scientific research laboratory at Eindhoven, Holland

Increasing Production of French Chemicals

Handicap of Winter Power Shortages

PRODUCTION of French chemicals in the Lyons district continues above the 1938 rate. The manufacture of electrochemical products has been hampered during the past two winters by power shortages and this situation is likely to occur again in the coming winter. Production of chlorine, caustic soda and calcium carbide is particularly affected.

A more regular supply of ammonia and nitric acid is expected to be available from equipment now being installed in the Saint-Etienne region.

The present French production and export of caustic soda are more important than before the war, as shown by the following figures:—

			Production metric tons	Export metric tons
1938	...	...	126,096	29,202
1946	...	...	104,708	14,329
1947	...	...	178,308	51,058
1948	...	...	196,000	53,097

In ten years, production has increased by 55 per cent. The 1949 figures so far available—approximately 17,000 metric tons a month—show further improvement.

Monthly production of soda ash in France in the first half of 1949 was below the average in the last quarter of 1948 which was 62,876 metric tons, states the

Ministry of Industry and Commerce. In the first quarter of 1949, output averaged 58,964 metric tons monthly. Production in April and May was 50,376 metric tons and 44,801 metric tons respectively; the preliminary figure for June is 41,730 tons.

The monthly average rate of copper sulphate production in France in the first quarter of 1949 was almost double that in the last quarter of the previous year and also exceeded that in the similar period of 1938, according to the Central Bureau of Industrial Statistics. Monthly averages were 8133, 4263 and 6750 metric tons respectively.

A scheme inaugurated in 1947 to increase output of phosphate rock in French Morocco is expected to raise the annual production to 4 million metric tons by 1952. Totals for 1948 reached 3,226,325 metric tons, an increase of 526,325 metric tons over the previous year.

The recent export of 1930 metric tons of fluorspar, valued at \$27,800, to the United States from Marseilles marked the first shipments of the mineral since before the war. Fluorspar was formerly a fairly regular export from the Marseilles district and the U.S. imports from France averaged 6000 short tons annually from 1920 to 1939.

DUTCH INDUSTRIAL TECHNOLOGY

(continued from previous page)

the simplifying of the manufacture of the correction plate invented by B. Schmidt so as to allow its production on a large scale. The Schmidt correction plate can now be used in cameras for photographing X-ray images produced on a fluorescent screen. It is now also possible to project enlargements of television pictures at no great additional cost.

The immense progress made in the manufacture of plastics has induced opticians and optical instrument makers to ask whether correction plates could not be made out of pressed material, and, indeed, polystyrene has been used for this purpose in the U.S.A. But this, involved rather a laborious process to produce a finished article of "optical qualities," and in the Philips' laboratories an entirely new method was worked out based on the shrinkage of gelatin solution when cooled.

The surprising thing is that shrinkage occurs so uniformly and so accurately that

a very smooth surface is obtained with every detail of the mould reduced five times, but otherwise unchanged.

Thus the mould can be five times less accurate than the corresponding plastic moulds because any errors are reduced to one-fifth. Fine scratches in the mould, for instance, are no longer any objection as they will become five times as thin during the drying process of the gelatin, and their depth will, in many cases, be less than the wavelength of the light. They will remain practically invisible.

A second advantage is that moderate heating and cooling of the mould will suffice. Moreover, as no pressing is required, no distortion will occur. Thirdly, there is no deformation or mechanical bending of the plate, as the correction plate consists very largely of glass. The hard gelatin layer is more resistant to scratches, so that there is no objection to cleaning the plate with a soft cloth. The same mould can be used for correction plates with different "optical strengths."

TEMPERATURE AND HUMIDITY CONTROL

Uses and Problems of Some Automatic Regulators*

By LEO WALTER, A.M.I.Mech.E., M.Inst.F., etc.

THE application of automatic temperature controllers to process work is prone to bring to light some apparently paradoxical factors.

A process may be simple in appearance and straightforward, as far as production is concerned, yet it may represent a difficult control problem. Some very complicated manufacture heating processes, on the other hand, permit quite simple means of setting up efficient automatic temperature control.

The fact that control by hand has produced quite good results, depending on the attention of a very skilled operator, who anticipates changes of temperature and acts accordingly, does not guarantee that the problem will not be a tricky one for automatic control.

It is disputable whether automatic control gear can often represent the perfect substitute for an efficient operator; even very elaborate temperature controllers, taking into account the amount and speed of temperature change for their counteraction and sometimes even the acceleration of changes, cannot have the quality of the human brain. They cannot remember or anticipate.

Merits and Limitations

During the last 20 years, there have been developed very efficient regulators with stabilising devices and mechanisms, which come as near to the perfect solution of the control problem as possible with mechanical means. Some are more reliable than the best operator. There are, however, instances where the human operator cannot be replaced, or where combined manual and automatic control is used.

A good operator can, of course, successfully improve bad heat balance by closing down heat input in an oversized heating surface long before any change of temperature has been visible, simply judging by experience. To blame the controller because it is incapable of doing just this is irrational and, taking into account the unreliability of the "human element" in general and the cost of an operator, the user should try to correct the plant

characteristics and avail himself of the very many advantages of automatic control. Reduction of size of heating surface might make the plant much more controllable, and might allow the use of standard controller types.

A practical instance helps to indicate some of the familiar factors.

A chemical factory used a very large vessel with heating coils and asked for recommendations to replace hand control. The process went on for several days, once the vessel had been filled, and it was necessary to employ three shifts of operators to watch the temperature and to make the necessary adjustments to the steam valves to coils.

Too Exacting

The plant engineer had discouraging experiences, in view of the cost of the change and the nature of the process. The firm stipulated so small an allowable tolerance for holding temperature, that the makers of controllers refused to make any recommendations at all.

After a short time (another charge having been spoiled during the night shift) further investigations revealed that the works chemist had stipulated a closeness of control which was never achieved with hand control and which the process, in fact, did not permit. Automatic temperature control did later preserve a reasonable maximum temperature, with some unavoidable fluctuations, and made the process independent of the operator's attention, as far as holding of temperature was concerned.

Briefly, closeness of control is a combined function of process and controller characteristics, and where the former are unfavourable, the user cannot ask for more accuracy than the process will allow. It is nearly always the process which governs controllability in the first instance, not the instrument.

Control and Fuel Economy

The practical application of thermostatic control by self-actuated or power-operated automatic temperature regulators is not the beginning but rather the end of measures for improving heat and fuel economy of industrial plant equipment. Recent years have produced great

* Previous parts of this series appeared in our issues September 17 (389-393) and October 15 (528-532).

progress towards this end and fuel consumption per produced unit of production or per square foot of heated factory space has diminished almost everywhere. Thermostatic controllers have played their full part in procuring these economies.

Research work and a great amount of practical investigation on heat and fuel economy in industrial works have laid the foundations for enormous possibilities of saving of fuel, but the continuing discrepancy between actual and desirable figures of fuel consumption in various branches of industry demands more detailed investigation of how heat—and especially steam and hot water—are used in practice.

These investigations are still going on, but there can be little doubt that the wider use of automatic control instruments in general, and of reliable temperature regulators for providing thermostatic control to process plant equipment and factory heating in particular will be recommended.

Common Objections

Once improvements by a competent authority have been recommended for heat—and fuel—economy, they should be carried out. The reasons for delays can be financial, or they can be reluctance to alter old-established and probably wasteful manufacturing methods or working conditions.

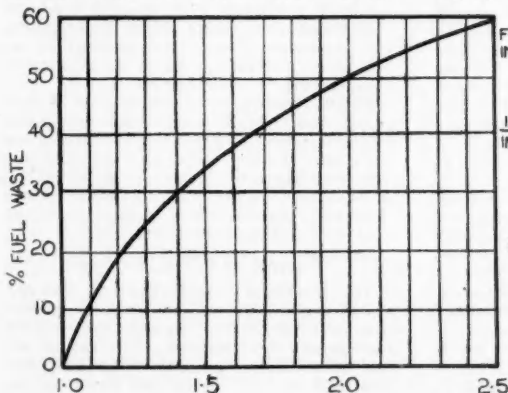
Instances have come to the writer's notice of workpeople who were reluctant to fit a straightforward temperature regulator, which would quickly have paid its way in steam savings, because they regarded any industrial instrument as "a box of tricks." In other cases it has been

pointed out that the plant is so old-fashioned and nearly obsolete that it is ripe for the scrap heap; but replacement at an early date is not today a certainty. What such deferment may mean in relation to industrial furnaces in terms of wasted fuel can only be guessed. Fitting automatic controllers to obsolete plant equipment is, however, usually a very difficult task, because low plant efficiency and control accuracy usually go hand in hand.

It is heartening, however, that most of the new factories, in being or being built, in this country are second to none so far as production equipment is concerned, and provide the utmost fuel—and heat—economy. Nearly all heat flow processes are automatically controlled and preventive maintenance of plant and of instrumentation is at a very high level of efficiency. The contrast which they afford with some of the older existing plants is extreme.

Reports from specialist engineers, who visit industrial establishments all over the country, are revealing documents. Investigating possibilities of thermostatic control of factory space heating reveals how commonly overheating of factory sheds takes place during mild weather or warm spells during the day, regardless of the axiom that overheating of 1° F. of room temperature can theoretically waste up to 5 per cent of fuel (Fig. 11).

Bearing in mind that heat losses from a building (which must be replaced by controlled heat input) are approximately proportional to the temperature differential between inside and outside temperature, it is obvious that even the best heating system is too powerful during mild



FUEL WASTED BY EXCESS TEMP.
IN HEATED BUILDINGS.

$$R = \text{RATIO} = \frac{\text{INSIDE TEMP.} - \text{OUTSIDE TEMP.}}{\text{INSIDE TEMP. REQ'D.} - \text{OUTSIDE TEMP.}}$$

EXAMPLE

ROOM TEMP. = 70° F
REQ'D ROOM TEMP. = 65° F
OUTSIDE TEMP. = 50° F

$$R = \frac{70 - 50}{65 - 50} = \frac{20}{15} = 1.33$$

FUEL WASTED = 25%

Fig. 11

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weather, unless it is controlled by room temperature regulators or centrally controlled by varying automatically steam-pressure or hot water flow temperature in the boiler house.

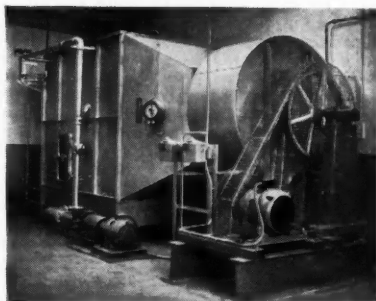
The use of room thermostats, which can be electrically or pneumatically operated or self-actuated, has increased since the war, but we are very far from the ideal state of every radiator, heating pipe range, unit heater or central air heater battery having its automatic temperature regulator. Automatic control of factory space heating, using the right mode of control and the right types of controllers, is a paying proposition, apart from the necessity to save fuel in the national interest. The number of obsolete factory heating systems, unfortunately, is still large, and it is doubtful if automatic control should be applied where a better heating system is the essential.

Fig. 12 illustrates a modern factory air conditioning system, where conditioned air is blown into the factory space at controlled temperature and humidity.

Air Conditioning

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The much wider use of air-conditioning plants with automatically controlled air temperature, humidity and distribution, not only as part of the manufacturing process (spinning rooms, etc.) but purely for heating and ventilating purposes would be a heat and fuel saving measure of first magnitude. Fig. 13 illustrates a central air conditioning plant, consisting of fan, air washer chamber, distribution duct and automatic controllers for air temperature and humidity, which can be placed in a small annexe and would improve working conditions and effect fuel savings. Wherever heating and ventilating is



[Courtesy of Hall & Kay Ltd.]

Fig. 13

inadequate or wasteful, the smaller air conditioning units, as ceiling or wall fittings, could procure the same effect in limited areas. They are equipped with temperature and humidity control instruments just as are the big central plants. They are largely exported to tropical and cold countries, but their use in home factories is also steadily increasing.

Another measure for improved economical heating systems is radiant heating. The use of wall or ceiling panels has been common for many years, but the use of wrought iron heating elements embedded in the floor of newly erected factory buildings is securing wide adoption in the U.S.A.

The other system, of pipes buried under the floor, which heat the whole building by radiation, permits control of the heating medium (either warm water or steam) to be performed centrally by inside-outside control of flow pressure, or flow temperature. It is claimed that considerable fuel and heat savings are obtainable from large radiant heating factory installations, but the available data in this country, under different climatic and structural conditions, do not allow a firm conclusion to be reached.

Thermostatic control of any well-designed and efficiently run factory heating system, whether using radiators, heating pipes, unit heaters, plenum heating batteries or air conditioning plants, is not "desirable auxiliary equipment" of a factory heating system, but a necessity.

There are many equivalent untapped sources of fuel economy, which, although known, are not being explored. How many central heating boilers, using coke or other fuels, are fitted with an efficient boiler combustion control system? This question does not take account of the ordinary bellows-thermostats, acting on



[Courtesy of Mellor Bromley & Co., Ltd.]

Fig. 12

the ashpit door, and giving only a very approximate draught control.

There are to-day many more effective methods, such as the electrical control gear, which provides a more efficient combustion control method. In this a flow thermostat actuates a motorised unit, which in turn automatically adjusts the ashpit damper and flue check damper. Replacement of uncontrolled, or badly controlled central-heating boilers in this country, assuming that each is responsible for a fuel loss of between 5 and 10 per cent, due to inefficient boiler control, might substantially alter the fuel supply position.

Another source of heat waste is the central heating systems of blocks of flats and large public buildings, which operate without inside-outside control. "Weather control" is, of course, also applicable to factory heating systems, using steam or accelerated hot water, and consists of an outdoor thermostat, which automatically readjusts a thermostatic blender, or a motorised gradual mixing valve, which mixes return water with flow water in the case of accelerated hot water heating. The outdoor thermostat instantly responds to any change of temperature, readjusts flow temperature without the usual prolonged time lag. Yet another control system, applicable to steam boilers for heating purposes, produces variation of boiler draught and combustion in accordance with the signals from an outdoor thermostat. It works electrically.

Process Control

The number of thermal industrial processes which lend themselves to thermostatic control is practically unlimited. Wherever heat flows into a manufacturing process, a definite amount of heat flow is required at any moment during processing. Automatic temperature regulation takes care of the fact that heat demand varies, and heat supply has to be adjusted accordingly.

Control of temperature of boiling liquids in open vessels is not generally feasible; the boiling temperature will always be in the region of 212° F., so that no real control impulses are obtainable from an immersion thermostat bulb. It is, however, exceedingly difficult for a plant operator to set a hand control steam valve exactly at the point where steam is not wasted by bubbling through the liquor uncondensed without giving up its heat.

It is, however, often possible to apply thermostatic control to temperatures just below the actual boiling point, which produces gentle boiling, or "submerged boiling." By setting the thermostat at,

say, 211° F., a near boiling condition of the liquor can be kept under control and steam and fuel are saved.

A great source of waste of heat is the use of steam for agitation, in addition to boiling, a principle that should be replaced by mechanical stirrers, compressed air or a circulation pump.

Hot Air Drying

Investigations of existing hot air dryers tend to show that many pieces of apparatus could be run much more efficiently. It is advisable to determine, before fitting thermostatic control, what is the efficiency of the dryer concerned.

Figures for steam consumption differ very widely for similar apparatus in different works, operating under more or less efficient working conditions. For example, these actual figures relate to textile dryers: A carboniser consumes from 2.6 to 0.56 lb. of steam per lb. of treated wool; a tunnel dryer from 2.9 to 1.2 lb.; a loose wool dryer consumes 2.7 lb. of steam under bad working conditions, but by introduction of recirculation of air and thermostatic control steam consumption per lb. of dried wool could be reduced to about 1.25 lb. of steam per lb. of dried wool.

Means of improving dryer efficiency are: Recirculation of exhaust air, which might produce heat savings up to 28 per cent; improvement of steam trapping and air venting; better distribution of warm air within the dryer; and, not least, application of automatic temperature and humidity control.

Control of Industrial Furnaces

One of the more interesting means of improving thermal efficiency of heat treatment and other types of furnaces is the highly sensitive electronic control system. In a pusher type continuous furnace, having two zones, automatic control is confined to the final zone and an optical pyrometer-controller with electronic amplifier regulates fuel supply via an electronic relay. The relay magnifies the minute impulses resulting from temperature changes for continuously readjusting a motorised gradual control valve in the fuel supply pipeline. An electric potentiometer-controller is used, with an indicating scale. In addition, furnace pressure is also regulated by an indicator-controller, and temperature in a selected zone is measured from a unit fitted in the furnace roof. Furnaces having three or more zones should have at least two zones automatically controlled.

(To be continued)

SCARCE MINERALS IN N. TRANSVAAL

Increased Demand is Stimulating Production

A COMPREHENSIVE review of mining activity in Northern Transvaal was recently presented to the Pietersburg Chamber of Commerce and Mines by Mr. G. F. Fourie, mining commissioner for the district. His report, which is for the year ended July 31, 1949, is published in *The South African Mining and Engineering Journal*, and emphasises the sustained interest in the Pietersburg area and its growing importance in base mineral production.

The Pietersburg mining district covers an area of almost 40,000 sq. miles, comprising Northern Transvaal. Nearly every known mineral occurs there and, of some 40 varieties discovered, 18 have been exploited. Gold, antimony, asbestos, copper, corundum, feldspar, mica, salt, silica, tin, and vermiculite are probably the most important of these.

Intensive prospecting by means of boreholes on the copper belt along the Murchison Range by a Johannesburg mining group has yielded significant results. Some of the boreholes disclosed that, in addition to copper, payable deposits of zinc were also present. If the zinc lode should be found to be an extensive body, it was likely that the first zinc mine in the Union would be located in the Northern Transvaal. Mr. Fourie looked forward to the opening of the Murchison Copper and Zinc Mine in the very near future.

Only the Messina (Transvaal) Development Co. was producing copper in Northern Transvaal, but Northern Transvaal (Messina) Copper Co., had made good progress in developing its property. Prospecting had disclosed that copper existed in payable quantities, and exploitation had started.

Copper Occurrences

Large areas which were considered to contain this mineral had recently been pegged in the Leydsdorp area. In addition to prospecting by means of boreholes along the Murchison Range, prospecting on other known lodes south of Messina and in the Matamba area was being continued. Copper occurrences along the Pafuri river, some 100 miles north-east of Louis Trichardt, were being investigated by a large American concern.

Pegging of new ground continued, and licences for some 62,613 base metal claims were issued. The total number of claims

held at July 31 was 112,715. Thousands of additional claims on the asbestos fields had been pegged and prospectors were still applying for licences. Some 75,000 claims were operative on these fields. In addition, many private farms had been taken up for asbestos mining.

During the last seven months over 9000 tons of asbestos fibre had been produced, and either shipped overseas or supplied to factories in the Union.

One of the urgent needs of the moment was for machinery for road work on asbestos properties.

Insufficient Tin

The production of tin was still below the Union's requirements. Only two mines were producing tin in the Pietersburg district, one having recently closed down. Prospecting parties for the Department of Mines were continuing investigations with encouraging results.

The Zaaiplaats Tin Mining Co. was still the only concern undertaking the smelting operation, and it had during the past year produced approximately 600 tons of metallic tin.

Vermiculite, although in very great demand, had diminished in output by some 4000 tons. Bad roads, reconditioning of plants, shortage of bags and reorganisation of the industry were the chief reasons. Plant extensions were being carried out by the three companies operating at Palabora and output should be increased early in 1950.

Recovery of gold had increased from 5000 oz. in 1947/48 to 11,000 oz. in the past year. Mining in the past had only been superficial, and nowhere had it been conducted at depths lower than 300 feet. There was a possibility of rich deposits being disclosed.

The demand from the U.S.A. for corundum remained firm but the African price must be kept low enough to combat competition of the artificial material.

In conclusion, Mr. Fourie stressed the great need in Northern Transvaal of an efficient water and electric power supply. A water supply dependent on boreholes did not encourage the establishment of new industries, nor was the system of small power units all over Northern Transvaal a satisfactory one.

Soviet Direction of German Industrial Chemistry

Complete Domination of Production

THE overruling authority for all industry in the Soviet zone of Germany is the SMA (Soviet Military Administration), and the chemical industries, like all others, are completely dominated down to the smallest detail of productive organisation by Russian economic principles. A writer in *Chemische Industrie*, October 1949, points out that the two-year plan for 1949-50 shows that production in the Soviet zone is directed entirely in accordance with the needs of the Soviet Union.

Expropriation and Dismantling

At least 80 per cent of the chemical industry has been expropriated. It is true that there is a so-called German organisation, the DWK (Deutsche Wirtschaftskommission or German Economic Commission) with its secretariat, which appears to be endowed with a certain amount of power and independence. That, however, is more apparent than real, despite the fact that it can issue decrees and regulations through its official organ *Zentralverordnungsblatt* published in Berlin.

The chemical industries have experienced a heavy toll of dismantling, so that more than 80 per cent of the soda industry and 60 per cent of the previous capacity of the sulphuric acid and nitrogen plants have been affected. Sulphuric acid is about the only important chemical that was not, before the war, manufactured in relatively large quantities in what is now the Soviet zone, and represented no more than 20 per cent of total German output. Now the output is only approximately one-third of the pre-war quantities, and does not meet the meagre demands of its own home market; and that demand is, of course, much reduced, for one thing by the almost complete cessation of superphosphate manufacture.

Diminished Supplies

This lack of acid and other basic chemicals, including calcium carbide (and acetylene), caustic soda, etc., has naturally had far-reaching effects on industries such as the manufacture of plastics, synthetic fibres, and others.

There is now little of private enterprise left. Most of the leading firms have disappeared and been replaced by Soviet

A.G.s or other form of Soviet undertaking. Examples (with present capital in 1 million roubles), of original German firms, are: Leuna-Werke, fertilisers, 400; Agfa-Wolffen, photographic films, 200; I. G. Farbenindustrie, Bitterfeld, alkalis, 210, potash production, 320; I. G. Farbenindustrie Schkopau, with others, rubber, 520. These statements of capital relate to the period before Soviet currency changes.

There appear to be two different categories of undertakings under Soviet regime, namely: (a) the so-called Soviet A.G.s or S.A.G., and (b) the Volseigene or Co-operative trusts. Under the former there are some 162 factories, employing 32,000 workers, with output for 1948 valued at RM.300 million. The number of factories controlled by these trusts in the different branches of chemical industry are: Inorganic (acids, alkalis, salts), 17; organic (solvents, dyes, glycerine, explosives, etc.), 7; potash, pyrites, fluorspar, 17; hydrocarbons (paraffins, waxes, candles, etc.), 17; industrial gases and carbide, 15; plastics and allied materials, 10; paints, varnishes, etc., 28; soaps, detergents, cosmetics, 14; drugs and medicines, 11; miscellaneous chemical-technical products, 26.

Distribution of Industries

Percentage distribution of (a) industry generally, and (b) chemical industry under the different categories or forms of undertaking, for 1949, is as follows:—

	(a)	(b)
Co-operative trusts	42%	20%
Semi-state	8%	—
Soviet A.G.	25%	60%
Private enterprise	25%	20%

The position in regard to inter-zonal chemical trade, e.g., with Western Germany, and to export trade, is not very clearly defined. As to inter-zonal trade, certain essential basic materials are apparently being obtained from the West. A so-called German Trading Co. (Deutsche Handelsges., Berlin m.b.H.) was established in 1948, to centralise trading in merchandise generally. It rapidly grew into a huge bureaucratic concern, employing 10,000 persons, but seems later to have been decentralised into several local offices. Although private enterprise is not yet wholly crushed, what little is left carries on under increasing difficulties and restraints.

CHEMICAL EXPANSION IN THE U.S.S.R.

Five-Year Plan to Develop Rich Resources

RUSSIA has enormous natural resources, and practically all the raw materials required to establish chemical industries on a large scale are, for the most part, plentifully available. The one possible exception is rubber, but here progress is being made in the synthetics field and also in the use of certain native plants capable of yielding natural rubber.

The removal to the East, during the war, of a large proportion of the chemical and other industries brought a substantial degree of industrialisation to the Ural districts, Siberia, and Central Asia; at the same time a great deal of reconstruction has been achieved in the West and in the Ukraine.

Eastern Russia gained other advantages from the Soviet policy, after the war, of exacting compensation by importing German plant and machinery and numbers of German scientists and engineers. Much of this material, both human and mechanical, was sent to the east. That helps to explain how in certain parts of Siberia and Central Asia, the greatest developments of chemical industry have taken place.

Special attention has been given to the chemical industries in the five-year plan for 1946-1950, and it has been stated by the Director of the State Planning Commission, N. A. Vosnessenski, that output of chemicals and allied products by 1950 would be $1\frac{1}{2}$ times that of pre-war.

Some of the estimates given for that year are: caustic soda 390,000 tons, soda ash 800,000 tons, mineral fertilisers (superphosphate, nitrate, potash) 5.1 million tons, synthetic fertilisers 43,000 tons, coal 250 million tons, petroleum 35.4 million tons, natural gas 1.9 milliard cu. m.

Production Plans

Phosphate production is being doubled, and new superphosphate factories are being erected in Central Asia to exploit deposits of natural phosphate at Kara-Tau. New branches of organic synthesis are being developed in order to manufacture by-products of coal distillation and oil refining. Three soda factories are being rebuilt; and other factories include two for aniline dyes; two for paints and varnishes; and three for plastics, of which new types are being developed.

According to the Soviet statement, the

output of synthetic rubber is to be doubled by 1950, that of automobile and tractor tyres tripled, and of rubber shoes increased by one-third above pre-war figures. It is estimated that the annual output of regenerated rubber will be 56,000 tons in 1950, and that of natural rubber from various native plants is to be organised on a much broader basis.

Fuels

Coal for coking is reported to be available to provide about 53 million tons p.a. Large advances are claimed to have been made in underground coal gasification, so that by the end of the five-year period, it is intended to produce 920 million cu. m. of gas. Liquid fuels from coal and shales should amount to 900,000 tons.

Peat is another of the fields in which research is said to have been prosecuted vigorously. Petroleum production and refining, especially in the east, has been largely increased. Both in quantity and quality, fuel oils for aircraft, tractors and automobiles and lubricating oils of all kinds are to be largely stepped up. Petroleum chemicals are also being developed. For the next five-year plan (1951-6) several new oil refineries are contemplated.

Commenting on these and other data in the most recent Soviet report, Prof. Dr. Peter-Heinz Seraphim, in *Chem. Industrie* (October) says that, despite the wealth of data provided, it is difficult to get a true picture of actual progress.

One important factor in making comparisons between pre-war and post-war achievement is the considerable extension of Russian territory. This may often account to a large extent for the increased production or increased capacity claimed. The new territories have certainly added substantially to timber, mineral oil, phosphate and other materials.

There is little doubt, however, that, compared with 1938, chemical output increased in 1948. The number of workers engaged is about 280,000 or 4.3 per cent of the industrial total, and the value of output represents 4.2 per cent of the gross total. Some figures for 1948 (1000 tons), with 1938 in brackets, are: sulphuric acid 1900 (1600), soda ash 610 (532), caustic soda 125 (88), aniline dyes 56 (35), rubber 79 (58), plastic materials 24 (14), asbestos 90 (86), apatite 1700 (1571).

AMERICAN CHEMICAL NOTEBOOK

From OUR NEW YORK CORRESPONDENT

THE Aluminum Ore Company, a wholly-owned subsidiary of the Aluminum Company of America, has completed construction at East St. Louis, Illinois, of a new plant to produce fluoride chemicals at a rate of 10 million lb. per year on one-shift operation. The principal products of the new plant, which represents an investment of about \$1 million, are sodium fluoride, sodium bifluoride and high-strength hydrofluoric acid. Fluorides are used extensively throughout the steel and ceramic industries, and an application of sodium fluoride that has gained attention recently is the fluorination of municipal water supplies, thought to be a means of preventing tooth decay.

Returning from Paris with the first blueprints of the process to reach the U.S.A., Mr. Graham W. Parker, a member of the American Society of Mechanical Engineers and New York consultant of the Société d'Electro-Chimie, d'Electro-Metallurgie et des Acieries Electrique d'Ugine, said that savings of 30 per cent or more in fabricating costs could be effected with the new Ugine extrusion process for finishing steels. The Ugine process made it possible to handle steel like a plastic material, he claimed. Using the process, molten steel could be extruded in a hydraulic press in the most intricate forms and sections, eliminating many costly operations of forging and machining. A significant instance of the economy the method permitted was the fact that finished gears of alloy steel could be produced in only two operations.

Dr. Herman E. Ries, Jr., head of the physical chemistry section of the Sinclair Refining Company Research Laboratories, Harvey, Illinois, has been awarded the \$3000 Ipatieff Prize in Chemistry for 1950. The 38-year-old chemist was cited for his contributions to the knowledge of catalysts, particularly those used in petroleum hydrocarbon conversion. He will receive the award at the 117th national meeting in Houston, Texas, next spring of the American Chemical Society, administrators of the award. Dr. Ries has been in the forefront of the physical chemists who have sought to explain the behaviour of

catalysts in terms of their basic physical properties, such as surface areas and pore structures. His work on the mechanism of catalysts has contributed to longer life and greater yields of petroleum products.

Assigned to the Government by the inventor, Paul S. Roller, a new patent (U.S. No. 2,469,413) describing a process for preparing barium aluminate has been made available for royalty-free licensing by the Solicitor, U.S. Department of the Interior, Washington 25, D.C. The patent describes a rapid high-temperature synthesis of barium aluminate, barium sulphate and alumina being mixed in molecular proportions with small additions of sodium, carbonate.

Patents for a new cast iron which can be bent or twisted have been granted to the International Nickel Company, according to a report made to the Gray Iron Founders' Society in Chicago, Illinois. The new iron is said to be much stronger and more shock-resistant than ordinary cast iron and to have many potential applications. It is expected to be of particular value in the motor vehicle making and the agricultural implements, machinery, oil, and railroad fields.

Free-flowing properties, permitting satisfactory dry mixing and handling, are claimed for a new grade of titanium dioxide which has been developed especially for vitreous enamels and the general ceramic field by E. I. Du Pont de Nemours & Company, Inc. The grade for use in vitreous enamels serves as an opacifier and is expected to have application in the ceramic field as well. Effective use of titanium dioxide has been made possible by recent developments in the method of manufacturing vitreous enamel, states E. I. Du Pont de Nemours. It is replacing other materials because of the economy in its use and the possibility of obtaining opacity with a thinner, more flexible film. The acid resistance of the enamel is said to be heightened. The new preparation is said to have a chemical purity equal to pigment grades.

HIGH-PRESSURE TUBING

16,300 p.s.i. at 1000° F.

ALLOY steel tubing which is claimed to withstand the extreme pressure of 10,300 p.s.i. at 1000° F. is included in the piping system produced by the Babcock and Wilcox Tube Company, Beaver Falls, Pennsylvania, for the coal-to-oil demonstration plants recently opened by the U.S. Bureau of Mines at Louisiana, Missouri.

The hydrogenation and synthesis processes involve high temperatures and unusually high operating pressures, in addition to the usual corrosion factor. The tubing used for valves and fittings, as well as the piping system of the paste preheater, splitting-phase unit and heat exchangers, includes sizes from 1 1/32 to 6 1/2 in. outside diameter and .145 in. to 1.169 in. in wall thickness. There is also hot finished or cold drawn tubing in low carbon, AISI 1040, AISI 4130, B. & W. Croloys 5, 9M and 16-13-3 (type 316) grades.

A striking factor of the tubing furnished is the size of the wall compared with the outer surface of the heavy-walled Croloy 16-13-3 used in the high-pressure elevated temperature part of the installation. This tubing has 25/32 in. exterior surface by 1.169 in. wall thickness, with a polished interior surface.

The high pressure tubing used in the higher temperature range is made of chromium-nickel-molybdenum austenitic stainless steel, and was chosen in preference to other stainless steels because of its high creep strength.

COMMERCIAL ACTINIUM

Large-Scale Refining Starts in U.S.A.

THE first industrial production of the radioactive element actinium has been announced by Boris Pregel, scientist and engineer and president of the International Rare Metals Refinery, Inc., New York City.

Actinium is about 150 times as active as radium, so that it is of great value to nuclear physicists in the production of neutrons. Generally, it has been obtainable only in sub-microscopic amounts. The success of Pregel and his technical staff in evolving a process for refining actinium industrially follows more than 50 years of effort by scientists all over the world to isolate the element in sizeable quantity.

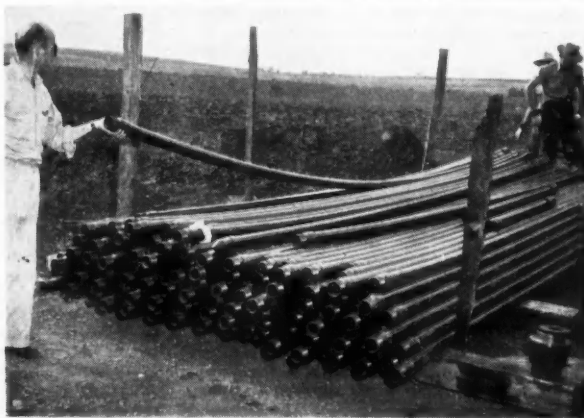
Actinium (Ac, atomic weight 227, atomic number 89) is a decay product of uranium 235, the natural isotope of uranium 238 around which the entire atomic energy programme was created. One of its merits in industry is that it is much safer than radium and may be used on luminous dials and it also promises to yield vital applications in the field of medicine, especially in the treatment of skin diseases and superficial tumors, employing its strong β -ray emission (1-1.5 Mev.).


Actinium's mild gamma radiation can be screened by a thin shield of glass or sheet plastic material.

Actinium has a half-life of 13.5 years, a durability which gives it a distinct advantage over polonium as an alpha-ray emitter, which has a half-life of only 138 days.

LIGHT-WEIGHT PLASTIC PIPING

A 20-ft. section of Carbon B tubing, which is extruded from a special variety of a cellulose acetate butyrate plastic, easily lifted by an installation worker at a salt-water disposal well in Kansas (U. S. A.), where 3387 ft. of this light-weight piping (1 1/2 tons) was used. It is claimed to be non-corrosive, and weighs only .826 lb. per ft. in 2 1/2 in. diameter





The Chemist's Bookshelf

FIBRE SCIENCE. Edited by J. M. Preston, The Textile Institute, Manchester. pp. 341. 30s.

The importance of relating scientific theory with industrial practice was emphasised by the Cotton Working Party report which recommended that the universities and technical colleges assisted by running post graduate and refresher courses for the benefit of industrial scientists. The lectures which form the basis of this volume were designed to serve this purpose.

The 18 post advanced lectures were delivered by a panel of 13 lecturers during the first half of 1947 at the College of Technology, Manchester, in collaboration with the Regional Advisory Council for Technical and other forms of Further Education for Manchester and district. The material has been collected into the present volume by Mr. J. M. Preston, of the department of textile chemistry, Manchester College of Technology.

In the opening chapters the chemistry of cellulose, pectic acid and related materials are discussed, followed by a discussion of protein and synthetic fibres and methods of determining their molecular weights. In view of the information to be gained from X-ray diffraction studies this aspect and the optical properties of fibres receive consideration. It is now realised that both the amorphous and crystalline regions in fibres play their respective parts in determining the nature and reactions of fibres. Of those depending on the amorphous regions mention may be made of swelling, extensibility and crease resistance.

Few fibres are used in their raw state with the consequence that the operations of finishing and dyeing are of major importance. The fine structure of fibres in relation to these operations is fully dealt with and the book finishes with chapters on the chemistry of keratin fibres and of synthetic fibre forming polymers.

The present volume forms a well written and concise account of the recent knowledge of textile science and the text is freely illustrated with diagrams and plates. The book should prove of value both to those already engaged in, and those about to enter this field.

MODERN METHODS FOR THE ANALYSIS OF ALUMINIUM ALLOYS. By a committee of chemists convened by the Association of Light Alloy Refiners. 1949. London: Chapman and Hall, Ltd. Pp. 144. 13s. 6d.

Ten chemists present in this book a survey of the methods used for the analysis of aluminium alloys. Many of the methods finally approved by the committee are new, while others are modified versions of those already known, and a few are now standard. Procedures are given for dealing rapidly with large numbers of samples and schemes are described for the estimation of several elements from one weighing. Methods range from those requiring modern physico-chemical instruments, such as the polarograph and photometer, to those which may be carried out with the normal equipment available in the general chemical laboratory. The text is divided into four chapters: Gravimetric and volumetric methods; electrolytic methods; photopolarographic methods. An appendix deals with less common elements and with composite schemes of photometric analysis. Eleven figures and numerous references give a good survey of the principles as well as of the literature on the subject.

EXPERIMENTAL PLASTICS FOR STUDENTS. C. A. Redfarn and A. Allcott. 1949. London: Iliffe and Sons, Ltd. Pp. 90. 10s. 6d.

Among the many recent publications on plastics, this book is distinguished by originality in its purpose. It describes 36 practical exercises developed during the past 15 years in the plastics technology laboratory of the Borough Polytechnic, London, to help plastics students to an appreciation of the principles involved in the production and moulding of plastic materials. Most of the exercises can be carried out by any organisation which has a small set of rollers, a steam-heated and water-cooled press, a steam-supply at 150 p.s.i., and a chemical bench with ordinary laboratory apparatus. There are 23 line illustrations and five appendices with calculation and conversion tables.

Technical Publications

A STUDY of the hand-fired, natural-draught, Lancashire boiler and the magnitude of various losses due to inefficient operation has recently been made and is now available as Technical Paper No. 55, issued by the Fuel Research Station of the DSIR (HMSO, 1s.). The paper gives precise data to show the effects of varying load on efficiency and the effects of soot blowing, and describes methods to measure the cost of inefficient operation. Reference is also made to a practical means of avoiding unnecessary heat losses by the use of a simple, smoke-eliminating fire door. While the paper indicates that conversion of this type of boiler to pulverised-fuel firing can lead to some gain of efficiency, it concludes that, if correctly fired, this type of boiler fitted with the new fire doors may have a thermal efficiency upon which it is difficult to improve by adopting mechanical stoking.

* * *

THE latest recommendations by the British Standards Institution relating to containers are contained in the newly published B.S. 1596—Fibreboard drums for oversea shipment. This standard will enable users, transport authorities and others to specify drums suitable for carrying dry powders, crystals, solid and semi-solid materials to their overseas destinations. This first edition of the standard relates only to drums made entirely from fibreboard, but work is proceeding with a view to extending it to cover fibreboard drums with metal, wooden or plywood ends. Manufacturers are recommended by the BS to avail themselves of the facilities of the institution's certification mark scheme for drums conforming with this standard. Minimum side-wall and end strengths are given for a range of drums having cubic capacities up to 17,200 cu. in., equivalent to a maximum net weight of 448 lb. or 62 Imp. gal.

* * *

GOOD technical explanation and simple descriptions of some of the essential tests of glue—viscosity, water absorption, etc.—are given in a booklet "The Story of Animal Glue," now available from Alfred Adams & Co., Ltd., West Bromwich. The history of glue, its difference from gelatin, raw materials from which it is made, extraction processes, grading system, etc., are all covered.



Courtesy, General Electric Co. Ltd., London.

Improved meter for measuring the thickness of non-magnetic coatings such as paints, sprayed metal, vitreous enamel, provided they are on magnetic bases

MANIPULATION and treatment of high-speed steels are considered in an article by H. W. Pinder in the current issue of *Alloy Metals Review* (Vol. 7, No. 53), published by High Speed Steel Alloys, Ltd., Widnes, Lancashire. Three types are covered tungsten, tungsten cobalt, and molybdenum, and there are a number of reproductions of photomicrographs and various graphs.

* * *

AN important characteristic of synthetic resin glues is that they are highly reactive to heat. The hardeners developed for use with these glues promote rapid setting by chemical reaction, and, if heat is also applied, extremely short curing times are possible. Radio-frequency is being increasingly used by a number of woodworking concerns influenced by the fact that heat is applied immediately at the glue line. A short account of radio frequency heating and of its application to Aerolite K, is given in Bulletin 82 of "Aero Research Technical Notes," now available from the Technical Service Department, Aero Research, Ltd., Duxford, Cambridge.

THE first detailed technical record of fire fighting equipment available to deal with normal and emergency conflagrations anywhere in the United Kingdom appears in the 1950 edition of *Fire Protection and Accident Prevention Year Book* (Benn, Brothers, Ltd., 10s. 6d., post paid). This lists not only all public Fire Brigades and the appliances they have, but provides also a similar record covering fire-fighting units wholly maintained by industry and private sources.

The Year Book also contains information about brigades in the Commonwealth and Empire and in many foreign countries and legal and technical data.

* * *

ANOTHER journal has been added to the group of 17 specialised publications produced by Benn Brothers, Ltd., in *The Ice Cream Industry*, the November issue of which appears for the first time from Bouverie House. The leading article pays tribute to Mr. Victor O'Neill who had been associated with the paper for the past 24 years.

PAINTS which indicate by a sharp, clear-cut change of colour the achievement of a predetermined temperature of a metal surface are manufactured by Synthetic & Industrial Finishes, Ltd., Watford. A pamphlet issued by J. M. Steel & Co., Ltd., which is the distributor of "Therm-index" paints, illustrates by colour photographs the various temperature effects. Many uses are claimed, of which application in heat treatment processes and in the hot working of light alloys are likely to be most attractive.

* * *

THE first comprehensive survey of all the research schemes in progress in the Caribbean area is contained in the Year Book of Caribbean Research, 1948, now published. The volume records that some 800 schemes and surveys are being undertaken. Schemes are classified by subject and territory and are divided into four main groups. The majority of schemes are related to agriculture, but a number are concerned with chemical technology, geology, medicine, engineering, etc.

Widening Use of Argon Arc Welding

ARGON arc welding* is one of the most recent developments of metal fabrication processes and new applications are continually being found for it.

In less than 10 years the process has developed from an interesting experimental effort in welding magnesium alloys, to one which can now be applied to most of the common metals and alloys. Many metallurgical, electrical and practical problems have been solved during this period, particularly those relating to the welding of aluminium and its alloys.

The main virtue of the argon arc process as far as aluminium is concerned is that welding can be carried out without the use of a flux and this enables fillet and lap welds to be used with confidence.

The main problem which was encountered in the early experiments on aluminium was that due to the rectification effect when using the a.c. argon arc. This has now been overcome from the practical point of view although it still requires considerable investigation before it is understood completely.

Modern equipment using specially designed transformers with a high open circuit voltage and condensers in series

with the welding leads suppresses the rectification effect and enables satisfactory welding to be carried out.

Because of the cost of the argon gas, welding aluminium and alloys by the process is still relatively expensive for normal fabrication shops, but the introduction of mechanical welding with higher rates of travel considerably reduces costs, which may then be competitive. The application of the process to heavier aluminium sections in this country awaits the development of heavier equipment than is yet available.

The use of argon arc welding for stainless steel is proceeding with very little trouble and the process now competes in certain ranges of thickness with metal arc welding.

The welding of copper by the argon arc process, however, is still not satisfactory, mainly because of the porosity encountered in the finished welds. Similar trouble arises when welding nickel and Monel, but Nimonic and Inconel appear to give satisfactory welds.

A new development of the process in America consists in replacing the tungsten electrode by aluminium wire which is fed rapidly. This makes the process less cumbersome and permits ready welding in the overhead and other difficult positions.

* Summary of a paper presented by W. K. B. Marshall at the annual autumn conference of the Sheet and Strip Metal Users' Technical Association.

HOME

7000 Bags Destroyed

Fire last week at the premises of the British Oil and Cake Mills, Ltd., Greenock, destroyed 7000 jute bags. It was caused by incandescent metal from a welding machine landing on a conveyor belt.

Post Office Telephones

In four years since the war, the Post Office has installed 2.25 million telephones, an increase, after allowing for those given up, of over 1.1 million. There are now 5 million telephones in use throughout the country and more than half a million applicants are on the waiting list.

Transport of Petroleum Regulations

Minor changes in the Petroleum Spirit (Conveyance) Regulations, which became effective this month, relate to the obligation of a driver to remain "in or in close proximity to" a road tanker and permit the use of up to 24 volts in the vehicle's electric lighting equipment.

Charge for Prescriptions

Its opinion that the proposed shilling charge on each prescription under the National Health service will not be effective in preventing misuse of the service has been put before the Prime Minister by the Pharmaceutical Society of Great Britain, representing 26,000 chemists. The society maintains that the charge will be prejudicial to persons genuinely needing medical attention.

Changed Oils and Fats Prices

The price of Empire stearine in softwood barrels is reduced from £119 to £117 15s. a ton, c.i.f., during the 8-week period from November 6 to December 31, states the Ministry of Food. One unrefined oil price is also increased; of cotton acid oil from £93 to £94 a ton (naked ex works) during the four weeks November 6-December 3. All other unrefined oils and fats remain at the same price during that period.

Zinc Prices Up

The price of good ordinary brand zinc was increased by £2 from £83 10s. to £85 10s. per ton delivered as from Thursday, November 3. Prices of other grades varied accordingly. The zinc oxide manufacturers announced that from the same date, the price of zinc oxide, in lots of not less than two tons, delivered, was increased by £1 10s. New prices were: zinc oxide (Red Seal), £82 5s.; zinc oxide (Green Seal), £83 15s.; zinc oxide (White Seal), £84 15s.

D

"C.A." at the Building Exhibition

THE CHEMICAL AGE and other journals of the Benn Brothers group will be represented at the Building Exhibition, Olympia (November 17-December 1) on Stand No. 462, Grand Hall Gallery.

BTH Birmingham District Office

British Thomson-Houston Co., Ltd., announces that its Birmingham district office staff is now situated in new premises at Geoffrey Buildings, John Bright Street, Birmingham, 1. The telephone number remains unchanged, Midland 6335.

Hospital Pharmacists Visit Works

A party of chief pharmacists from hospitals in the London area and in Scotland recently made a two-day visit as guests of Evans Medical Supplies, Ltd., to the company's principal establishments at Liverpool and Runcorn. The tour included a dinner party in Liverpool given by the directors and managerial staff.

Soap Rationing

The increase in individual soap rations, from seven to eight rations per eight weeks for ration books RB1 and RB4 and eight to nine rations for holders of ration books RB2, took effect on November 6. The new ration will be obtainable in the second four weeks of each 8-week period, starting with ration period No. 8 which begins on December 4.

Coal Production

Britain's output of deep-mined coal last week, at 4,253,200 tons, was the highest this year. It compared with 4,165,400 tons in the previous week and 4,437,006 in the best week of 1948. The average weekly output so far this year of 3,861,800 tons is still below the amount required to reach the various targets set. In the last full pre-war year the weekly average was 4,353,300 tons.

World Resources

The main item on the agenda of the Parliamentary and Scientific Committee meeting in November will be a discussion of the recent World Resources Conference at Lake Success, with special reference to the possible implementation of President Truman's "Fourth Point." The chairman, Mr. M. Philips Price, M.P. (who attended the conference) and some other distinguished British scientists who were there have been invited to address the committee and initiate a discussion.

OVERSEAS

Natural Gas for Atomic Plant

A 170-mile underground pipeline will be completed in December to carry natural gas from Greenbriar to the United States atomic plant at Oakridge, Tennessee.

70 Reported Killed in Uranium Mine

Seventy German miners were killed in a uranium mine explosion near Zwickau, in the Soviet zone, when a powder supply blew up, the Western licensed newspaper, *Social Democrat*, announced on November 6.

Izmir International Fair, 1950

The British Chamber of Commerce of Turkey announces that it will again take part in organising a British pavilion for the Izmir International Fair to be held from August 20 to September 20 next year. At this year's Fair the British pavilion contained 49 stands and products of approximately 129 manufacturers.

Canadian Trade Press Visit to U.K.

To ensure that U.K. goods shall be better known in the Dominion, six representatives of the Canadian trade Press have been invited by the Government to make a three week's tour of British industries. After a week in London, the party will spend a fortnight in the provinces and Scotland where they will meet leading exporters and industrialists and visit factories.

Argentine Tung Oil

The 1949 harvest of Argentine tung nuts is expected to be between 55,000 and 60,000 metric tons compared with 40,000 to 45,000 tons last year, according to the United States Department of Commerce. This year's crop may yield 8400 tons of oil compared with 6000 tons last year. Declining availability of tung oil from China heightens interest in the Argentine supply.

Norway's Domestic Uranium Ore

Domestic sources of uranium are stated as probably sufficient to supply Norway's first atomic pile now under construction, for which the equivalent of some £750,000 has been earmarked. Uranium for this project at present comes from feldspar deposits in Southern Norway. No large-scale uranium search has been started, though prospectors have been active in areas where uranium is thought most likely to occur. Most of the richer samples have come from feldspar districts near Setesdal and Kristiansand.

Buna for E. Germany?

The Buna works in the Eastern zone of Germany is reported to be exporting synthetic rubber on an increasing scale, chiefly to Czechoslovakia, Poland, Sweden and Switzerland.

New Indian Mica Standards

The Indian Standards Institution has recently prepared two new standards for mica with the object of ensuring uniformity of quality of this important item in India's export trade.

Uranium Reported in W. Germany

Dr. Albert Kummer, a German engineer, claims to have found traces of uranium ore deposits in the Fichtel mountains, in the American zone of Germany, near the junction of the Soviet zone and Czechoslovak borders. It is the first report of uranium in Western Germany.

Australia to Use German Steel Press

The most important single item of reparations obtained by Australia from Germany is a 5100-ton hydraulic forging press, valued at £250,000. It is being made available to the Commonwealth Steel Company of Newcastle, New South Wales, on a rental basis, and will perform forging work on propeller shafts, steam boilers, and other articles previously imported.

Aluminium Electric Cable

An Australian company at Port Kembla, New South Wales, is now manufacturing nine miles of steel-cored aluminium conductor cable for one of the largest high voltage power-line spans in the world. It is to stretch for a mile and a third across the Eildon Reservoir in the State of Victoria, and is being made for the State Electricity Commission for the six conductors of the 220,000 volt Kiewa-Melbourne transmission line.

U.S. Aluminium and Bauxite

Primary aluminium production in the U.S.A. during the first six months of 1949 was 323,126 short tons, over 6 per cent more than the quantity produced in the corresponding period of 1948, states the U.S. Bureau of Mines. Bauxite production from U.S. mines in the second quarter of this year is reported to have been 332,553 long tons (dried equivalent). This was about 5 per cent more than was raised in the first quarter. Over 96 per cent of the April-June yield came from Arkansas.

PERSONAL

BIRMINGHAM University has announced two important new appointments in its metallurgical department. DR. A. H. COTTRELL becomes the University's first professor of physical metallurgy, and DR. GEOFFREY VINCENT RAYNOR is appointed its first professor in metal physics. Their appointments raise the number of chairs in metallurgy at Birmingham to four. PROF. A. J. MURPHY, who was recently appointed to succeed PROF. L. AITCHISON as professor of industrial metallurgy, is to take up his duties at the beginning of next year. PROF. D. HANSON, who has been responsible for the development of metallurgy in Birmingham University for many years, remains as director of the departments of metallurgy and industrial metallurgy.

The following officers were elected for the coming year at the 31st annual general meeting of the Chemical Club held recently in London: J. DAVIDSON-PRATT (president); A. J. AMOS (chairman of the executive committee); E. H. T. HOBLYN (hon. treasurer), J. HOY ROBERTSON (hon. secretary). Members of the committee: E. CHILMAN, W. DIXON, F. A. GREENE, F. J. GRIFFIN, C. W. HERD, O. JONES, S. I. LEVY, L. R. B. PEARCE, W. PRESTON, J. F. RONCA, TREVOR A. SMITH.

DR. FREDERICK D. ROSSINI, chief of the Thermochemistry and Hydrocarbon Section of the U.S. National Bureau of Standards, has been appointed professor and head of the chemistry department at the Carnegie Institute of Technology, Pittsburgh, Pennsylvania. The appointment becomes effective July 1, 1950. Dr. Rossini is the United States member and chairman of the Standing Committee on Thermochemistry of the International Union of Chemistry.

MR. R. F. BULLER, who is in charge of the solvents section of Sales Development Department, Shell Chemical Corporation, New York, is in England on a visit to Shell Chemicals, Ltd. He has been in close contact with the lacquer industry in the United States for the past ten years and has been directly concerned with the corporation's technical service programme. He spoke, this week, to the London Section of the Oil and Colour Chemists' Association on "Recent Experiences with Lacquer Solvents in the United States."

At the recent annual general meeting of the British Colour Makers' Association the following officers and council for the ensuing year were elected: Chairman: MR. J. H. GRIMSHAW (Horace Cory & Co., Ltd.); vice-chairman: MR. H. GOSLING (Cornbrook Chemical Co., Ltd.); hon. treasurer: MR. C. G. A. COWAN (Cowan Bros. (Stratford), Ltd.); council: MR. C. M. BEAVIS (Golden Valley Ochre & Oxide (Colours) Co., Ltd.); MR. F. BURRELL (J. W. & T. A. Smith, Ltd.); MR. H. GOSLING (Cornbrook Chemical Co., Ltd.); MR. J. H. GRIMSHAW (Horace Cory & Co., Ltd.); DR. H. SAMUELS (I.C.I., Ltd.); MR. V. WATSON (Cromford Colour Co., Ltd.); MR. H. A. WILSON (The Derby-Oxide & Colour Co., Ltd.); MR. C. E. YOUNG (Hardman & Holden, Ltd.); secretary: MR. ALLAN J. HOLDEN.

The Colwyn Medal for 1949 has been awarded by the Institution of the Rubber Industry to MR. E. A. MURPHY, manager of the general development division at Fort Dunlop, for his work in connection with the development of latex.

British Industrial Solvents, Ltd., has announced the appointment of MR. LEONARD C. WEST as an assistant sales manager, in charge of the sales development department at the London head office, 4 Cavendish Square, W.1.

MR. JAMES HARNAMAN, a director of Laporte Chemicals, Ltd., who has recently been appointed resident director of the company's Baronet Works, Warrington, is to be succeeded as works manager at Luton by MR. E. O. ROUNSEFELL.

Obituary

THE death in the U.S.A. last week of MR. SOLOMON R. GUGGENHEIM removed the last of a family whose operations in the metal and mining world placed the U.S.A. in its present position of leadership in world metal affairs. Mr. Guggenheim, who was 88, was the last of seven brothers, who, as Guggenheim Bros., widely exploited the non-ferrous metal resources of Latin America and were reputed at one time to control almost a half of the world's copper supplies. A substantial proportion of the vast earnings from their operations was devoted to cultural and scientific objects in the U.S.A.

Next Week's Events

MONDAY, NOVEMBER 14

Institute of Physics

Birmingham: James Watt Memorial Institute, Great Charles Street, 7 p.m. (With Institution of the Rubber Industry). Papers on "Behaviour of Rubbers at Low Temperatures."

Society of Chemical Industry

Bradford: Technical College, 7.15 p.m. (With other associations). Edward Race: "The Rotting and Rot Proofing of Textiles."

The Royal Institute of Chemistry

Leeds: University, 6.30 p.m. Prof. J. W. Cook (president): "Synthetic Analgesics and Anti-spasmodics."

TUESDAY, NOVEMBER 15

Institute of Physics

London: 47 Belgrave Square, S.W.1, 5.30 p.m. (Electronics Group). G. Bradfield (National Physical Laboratory): "The Generation and Launching of Ultra-sonic Waves."

Institute of Petroleum

Manchester: Engineers' Club, Albert Square, 6.30 p.m. F. Green: "Greases."

WEDNESDAY, NOVEMBER 16

The Royal Institute of Chemistry

London: Royal Society of Medicine, 1 Wimpole Street, W.1, 6.30 p.m. Annual general meeting.

Dublin: Trinity College, 7.45 p.m. D. W. Kent-Jones: "What is Our Bread Made From?"

Chemical Engineering Group (SCI)

Newcastle: (With the Newcastle section, SCI). Dr. G. F. Whitby: "Planning and Design of a Chemical Factory."

Institute of Metals

London: The Royal Institution, Albemarle Street, W.1, 10 a.m. One-day symposium on "Metallurgical Applications of the Electron Microscope." (With other associations).

Incorporated Plant Engineers

Bristol: Grand Hotel, 7.15 p.m. (West-ern Branch). E. G. Ritchie: "Factors Influencing the Choice of Boiler Fuels."

THURSDAY, NOVEMBER 17

The Chemical Society

London: Institution of Mechanical Engineers, Storey's Gate, S.W.1, 7.15 p.m. Centenary lecture. Dr. M. Magat (Paris): "Radiation Induced Polymerisation."

The Royal Society

London: Burlington House, Piccadilly, W.1, 4.30 p.m. Special general meeting to consider the annual report of the council.

Building Trades Exhibition

London: Olympia. Daily (until December 1).

Incorporated Plant Engineers

Liverpool: Radiant House, Bold Street, 7 p.m. (Liverpool and North Wales Branch). Whitley Moran: "Repair and Maintenance of Industrial Buildings."

Institute of Physics

London: Institution of Electrical Engineers, Savoy Place, W.C.1, 5.30 p.m. (With the Institution of Electrical Engineers and the Education Group). Discussion: "The Education and Training of Technologists."

Textile Institute

Manchester: 16 St. Mary's Parsonage, 7.15 p.m. F. Happey (Courtaulds, Ltd.): "A New Approach to the Problem of the Structure of Cellulose and Its Derivatives."

Oil & Colour Chemists' Association

London: Manson House, 26 Portland Place, W.1, 7 p.m. P. J. Gay: "Accelerated Weathering, So-Called." (Repeated, Birmingham, Friday, November 18).

Royal Institute of Chemistry

Hull: Royal Station Hotel, 7.30 p.m. Dr. F. Roffey: "The Development of Chemical Processes."

FRIDAY, NOVEMBER 18

The Chemical Society

South Wales: Swansea University College, 5.30 p.m. (With University College of Swansea Students' Chemical Society). Prof. M. G. Evans: "The Formation and Reactions of Free Radicals in Solution."

Institution of Electronics

Manchester: Reynolds Hall, College of Technology, 6.30 p.m. B. N. Watts: "The Application of Infra-Red Detectors."

Atomic Scientists' Association

London: University College, Gower Place, W.C.1, 6 p.m. Dr. W. J. Arrol: "Industrial Uses of Radioactive Substances."

SATURDAY, NOVEMBER 19

Institution of Chemical Engineers

Manchester: College of Technology, 3 p.m. (North Western Branch). N. Swindin: "The Growth of the Chemical Industry in the Manchester District."

Law and Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

ANTI-MISTANT, LTD., Sidcup, chemical manufacturers, etc. (M., 12/11/49.) October 11, £3000 charge, to Northern Assurance Co., Ltd.; charged on premises known as Rectory Works, North Cray. *Nil. September 6, 1946.

SCRIVENS, LTD., Birmingham, manufacturing chemists. (M., 12/11/49.) October 12, mortgage to Scottish Amicable Building Society securing £1950 and any other moneys, etc.; charged on 28 Westwood Road, Sutton Coldfield. *Nil. March 14, 1949.

SYNTHETIC & INDUSTRIAL FINISHES, LTD., Watford. (M., 12/11/49.) October 13, £5000 debenture, to S. W. Kendall, Watford, and another; general charge. *Nil. December 31, 1947.

New Registrations

Carnegie Bros. (1949), Ltd.

Private company. (474,510). Capital £2500. Manufacturing chemists, oil and colour men, etc. Directors: D. M. B. Carnegie, M. Carnegie. Reg. office: 44 Tewin Road, Welwyn Garden City, Herts.

Jefferies Chemical Company, Ltd.

Private company. (474,426). Capital £100. Manufacturing chemists. Directors: H. C. Jefferies, N. P. Widdowson. Reg. office: 21 Bride Lane, E.C.4.

Increase of Capital

The following increase of capital has been announced: **GENERAL TRADE & CHEMICAL EXPORTS CO., LTD.,** from £1000 to £5000.

\$4.1 M. for French Oil Projects

THE continuing policy of the Marshall aid administrators to facilitate large expansion of European oil refining capacity is reflected in the recent decision of ECA to release \$4.1 million to finance modernisation and expansion plans of French oil refining industry, the total cost of which is estimated at \$44 million. This is the second Marshall Aid allocation in the second half of the current year. ECA granted towards the end of August \$3.9 million for the carrying out of expansion of the Donges, near Saint-Nazaire, plant, of the Raffineries Françaises de Pétroles de l'Atlantique and of the Compagnie Française de Raffinage at Gonfreville (near Le Havre) and in La Mède (Marseilles).

The latest allocation of dollars will benefit three more French oil companies—the Société de Raffinage du Pétrole Shell-Barre, which plans to transfer the capacity of its Pauillac refinery, near Bordeaux, largely destroyed during the war, to its Berra refinery. The annual capacity of the Berre plant is to be increased by 800,000 tons to 2.33 million. The transfer and expansion will cost about \$31.7 million, of which \$1.85 million will be provided by ECA. The other companies to receive ECA aid are the Compagnie de Raffinage de Pétrole "Secony-Vacuum Française" (\$850,000), and the Standard Française de Pétrole (\$1.4 million).

It is expected that most of this dollar aid will be used for the purchase of specialised plant and equipment in the U.S.A.

New Insurance Machine

A MECHANICAL innovation in office equipment, the Neopost insurance machine, has received the approval of the Ministry of National Insurance. It has been adopted by several large firms in the chemical and allied trades. The machine does away with the need to purchase and affix stamps on insurance cards, as it prints an impression direct on to the card, and meters keep an accurate record of the contributions.

Payment of contributions is made direct to the Ministry periodically by cheque, so that the handling of large sums of cash is avoided and no stamps have to be bought and safeguarded.

The Stock and Chemical Markets

A FRESH fall in British funds, which brought $2\frac{1}{2}$ per cent Treasury Bonds and 3 per cent Gas and Transport stocks to new low levels, has made for renewed caution in stock markets. The fall in Gilt-edged, mainly confined to long-dated stocks, has followed the higher interest rates charged by the Agricultural Mortgage Corporation. This latest illustration of the trend to dearer money has increased the view that a higher bank rate may be inevitable early next year.

Short-dated stocks were steady, helped by rumours that the $1\frac{1}{2}$ per cent Exchequer Bonds, which fall to be repaid next February, may be offered conversion into a new "tap" loan, terms of which may shortly be announced.

Industrial shares have been uncertain. Rising costs of materials, it is feared, will mean reduced profits for many industrial companies if continued over the next few months.

Imperial Chemical eased further to 42s. $1\frac{1}{2}$ d., Dunlop Rubber were 60s. and Monsanto Chemical 51s., while Fisons changed hands around 27s. 6d. Shares of companies connected with plastics had a fresh relapse, British Xylonite falling back again to 53s. 9d. after rallying to 57s. 6d. Kleemann 1s. shares eased to 8s. $4\frac{1}{2}$ d. on the reduced profits and cut in the dividend from 240 per cent to 140 per cent. De La Rue were 20s. 9d. and elsewhere the 4s. units of the Distillers Co. were 16s. $4\frac{1}{2}$ d. "ex" the share bonus. British Glues & Chemicals receded to 17s. 6d. with the general trend of markets, British Aluminium remained at 40s., but Turner & Newall moved lower to 72s. 9d. and United Molasses were 36s. 6d.

Boots Drug, after rising, fell back to 47s. 6d., British Drug Houses were 6s. 9d., but elsewhere iron and steels were helped by the industry's fresh production records. United Steel rallied to 25s. 6d., Colvilles to 31s. 6d., Hadfields to 25s. 3d., while Staveley firmed up to 76s. 6d. and Bolsover have been firm at 60s. In the event of nationalisation iron and steel shares should be worth "take-over" valuations; and in most cases current prices are well below these levels.

Triplex Glass 10s. ordinary have been steady at 17s. 6d., at which there is a not unattractive yield on the basis of last year's 10 per cent dividend. The export drive by the motor-car industry foreshadows bigger demand for safety glass. In other directions, Glaxo Laboratories

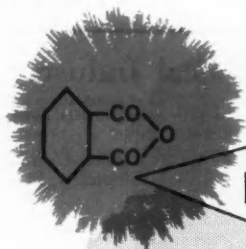
have been firm at around £18 $\frac{1}{2}$, the market in the shares still being governed by the pending share bonus recently announced. Oils have been easier with Shell at 67s. 6d., Anglo-Iranian £7 and Trinidad Leaseholds 24s. 3d.

Market Reports

THE demand for industrial chemicals continues to be fully maintained and a fair amount of new business has been put through. Contract deliveries to the main consuming industries are reported well up to schedule with buyers showing increasing interest in contract replacements. The outlet in the export field remains good. The demand for the potash chemicals continues at recent levels and there has been no easing in the demand for the soda compounds, quotations for which remain unchanged. In other directions there has been no special feature and prices generally have a firm undertone. Although there has been little change in the position of the coal tar products, rather more interest is being displayed in the market, particularly for the tar acids. Pitch is again in good call on home and export account.

MANCHESTER.—The textile and other principal chemical using trades in Lancashire and the West Riding of Yorkshire are well employed and there has been no sign of contraction of demand for heavy chemical products. Soda ash and the other alkalis, as well as the potash, ammonia and magnesia compounds, are being taken in the home market in good quantities, and there is a fair amount of fresh inquiry for shipment to overseas. In the market for the by-products, the light materials seem to be the most active.

GLASGOW.—The Scottish chemical market has continued to be unsettled by the uncertainty of prices. A further increase in the price of petroleum products has been notified this week, and some heavy buying took place. Prices of products affected by the metal market have also been subject to a number of increases. The volume of business being transacted, however, continues on a fairly good scale and shows a steady increase over previous years. In the export market little in the way of tangible results as yet has resulted from the devaluation of the pound sterling. It is doubtful, as far as Scottish chemicals are concerned, whether much advantage is likely to be obtained.

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Patent Processes in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patents Office, Southampton Buildings, London, W.C.2, at 2s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Process for the preparation of chloral from chloral alcoholate.—N.V. De Bataafsche Petroleum Maatschappij. Aug. 2 1946. 629,699.

Process for the manufacture of 3-methoxy-pyridine and derivatives thereof.—Roche Products, Ltd., A. Cohen, and E. G. Hughes. July 21 1947. 629,423.

Soft solder for aluminium and aluminium alloys.—Soudalco. March 22 1946. 629,425.

Process for the preparation of water-soluble dyestuffs of the phthalocyanine series.—Sandoz, Ltd. Aug. 1 1946. 629,488.

Manufacture of oil-modified alkyl resins.—I.C.I., Ltd., D. Atherton, and J. K. Lovell. Aug. 13 1947. 629,490.

Decomposition of organic peroxides.—Distillers Co., Ltd., B. V. Aller, R. H. Hall, and R. N. Lacey. Aug. 21 1947. 629,429.

Preparation of monochloromethylpentamethylsiloxane.—Dow Corning Corporation. Feb. 10 1947. 629,491.

Process for the manufacture of 2:3:4-triamino - pyridin. — Roche Products Ltd. (F. Hoffman-La Roche & Co., A.G.). Sept. 23 1947. 629,439.

Process for the manufacture of 2-amino-6-hydroxy-8-(hydroxymethyl) - pteridine. Sept. 24 1946. 629,440.

Process for the manufacture of an amino pyrido-imidazole.—Roche Products, Ltd. (Hoffman-La Roche & Co., A.G.). Sept. 23 1947. 629,441.

Nickel alloy castings.—Mond Nickel Co., Ltd. Oct. 7, 1946. 629,574.

Manufacture of pyridoxin.—Roche Products, Ltd., and A. Cohen. Oct. 9 1947. 629,450.

Colouring of highly polymeric linear esters.—I.C.I., Ltd., R. Hardwick, and E. Waters. Oct. 20 1947. 629,452.

Corrosion-resistant articles.—Mond Nickel Co., Ltd., E. C. Rhodes, and D. W. Rhys. Dec. 1 1947. 629,581.

Treatment of impurity-containing solutions.—J. J. Naugle. Dec. 23 1946. 629,899.

Method for sweetening hydrocarbon liquids containing mercaptans.—Pure Oil Co. Dec. 6 1944. 629,914.

Process for the manufacture of halogenated derivatives of the naphthoquinone series.—P. May. (Sandoz, Ltd.). July 22 1947. 629,706.

Distillation of acid-treated mineral oils.—Standard Oil Development Co. Oct. 3 1946. 629,711.

Oxo synthesis process.—Standard Oil Development Co. Dec. 6 1946. 629,915.

Ceramic dielectric compositions.—C. E. Every. Aug. 26 1947. 629,713.

Preparation of mono-chloromethyl silicon chlorides.—Dow Corning Corporation. Feb. 10 1947. 629,719.

Temperature recording devices.—British Thomson-Houston Co., Ltd. Nov. 27 1946. 629,744.

Methods of dephosphorising iron and steel.—Soc. Anon. des Hauts-Fourneaux de la Chiers. June 24 1947. 629,745.

Cemented carbide body having a soft metal insert and a method for securing the insert therein.—British Thomson-Houston Co., Ltd. Nov. 20 1946. 629,757.

Coating compositions containing synthetic resins.—Westinghouse Electric International Co. Dec. 7, 1946. 629,787.

Equipment for collection and transmission of the energy of a moving fluid.—J. M. L. G. De Camaret. Dec. 12 1946. 629,798.

Electrode holders for oxy-electric cutting of metal.—Rockwell, Ltd., D. J. W. Boag, and J. L. Hamilton. Dec. 8 1947. 629,806.

Joints for forming a gas-tight connection between two axially aligned tubular elements.—Rockwell, Ltd., D. J. W. Boag, and J. L. Hamilton. Dec. 8 1947. 629,807.

Heat and acid resisting iron alloy.—E. H. Schwarz. Dec. 3 1940. 629,859.

Carburisation of iron and iron alloys.—General Electric Co., Ltd., and D. M. Dovey. Dec. 30 1947. 629,879.

Production of high grade aviation fuels from crude petroleum oils.—Anglo-Iranian Oil Co., Ltd., and D. A. Howes. Feb. 24 1941. 630,245.

Production of motor fuels of high octane number.—Anglo-Iranian Oil Co., Ltd., and D. A. Howes. Feb. 24 1941. 630,246.

Method and apparatus for heating flow-in gases or vapours.—Industriekemiska A/B, and J. O. Naucler. Nov. 28 1941. 630,184.

Dehydrohalogenated derivatives and process of producing the same.—G. L. Martin Co. Feb. 15 1945. 630,248.

Process for the production of calcium magnesium phosphates.—E. M. Vermehven. April 1 1946. 630,196.

Ketones

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KG1

APPLIED CHEMISTRY

Series of Post-Graduate Lectures

OF interest to some chemists, research workers and others is a course of post-graduate lectures in applied chemistry to be held at Acton Technical College, during the Spring term, 1950.

The lectures, details of which appear below, will be given on Friday evenings at 7.30 p.m., beginning on January 13, 1950.

C. C. Hall will open the series with two lectures (January 13 and 20) on "The Fischer-Tropsch and Related Processes."

"The Theory of High Polymer Synthesis," will be covered by W. Davey in the next two lectures (January 27 and February 3).

The remaining eight lectures will be given by W. H. Stevens, four on "Polymers, Scientific and Industrial Classification, Plastic Materials, Sources, Properties as related to Utilisation and Modern Industrial Processes" (February 10, 17 and 24, March 3); and four devoted to "Modern Methods of Testing and Analysis of Plastic Materials, Special Applications, Factory Procedure and The Plastics Industry" (March 10, 17, 24 and 31).

U.S. COKE FIGURES

Largest Distribution on Record

AMERICAN coke-plant operators in 1948 distributed 74,214,856 tons, the largest quantity of coke on record, states the U.S. Bureau of Mines. Requirements of metallurgical grades by the iron and steel industry (then operating at its highest level since 1944) accounted for 85 per cent of the total from ovens.

Blast furnaces also used a larger tonnage than ever before, due mainly to poor fuel efficiency. The quantity of coke used in the manufacture of water gas has been increased nearly threefold since 1936.

A decline of 11 per cent, however, in the amount of coke used for other industrial needs—non-ferrous smelting operations, chemical process industries, etc.—is recorded in a comparison with 1947. Coke distributed for domestic consumption was the lowest in 24 years.

Exports of coke and breeze in 1948 decreased 9 per cent from 1947 and were the lowest in seven years. The exportation of metallurgical coke, the grade in shortest supply, has been restricted to the Western Hemisphere.



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SITUATIONS VACANT

None of the vacancies in these columns relates to a man between the ages of 18 and 50 inclusive, or a woman between the ages of 18 and 40 inclusive, unless he or she is exempted from the provisions of the Control of Engagement Order, or the vacancy is for employment exempted from the provisions of that order.

THE CAMBRIDGE INSTRUMENT COMPANY, LTD. have a vacancy for an Assistant Chemist. Applicants should at least have passed their Inter B.Sc. or equivalent and have a preference for Electro-Chemistry. Salary according to qualifications and experience. Apply Personnel Dept., Sydney Road, Muswell Hill, N.10.

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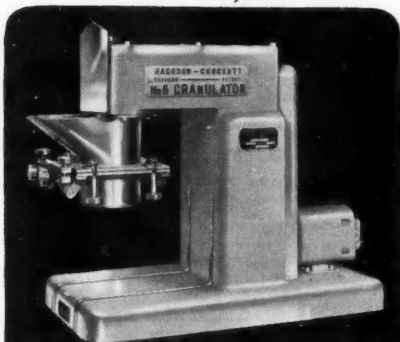
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